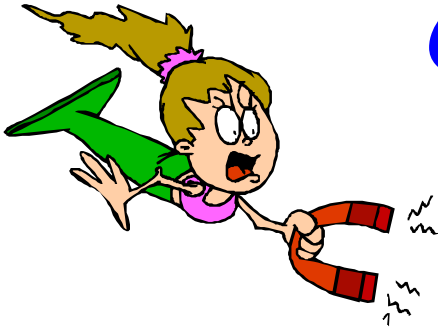


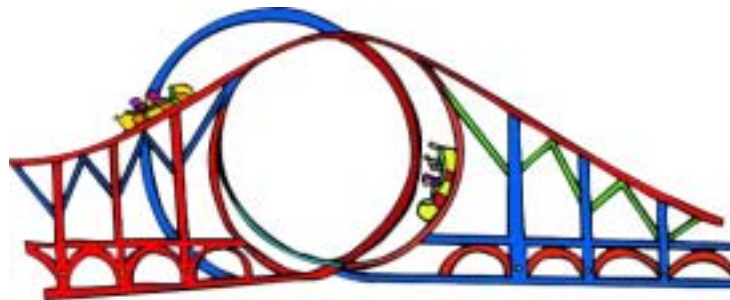
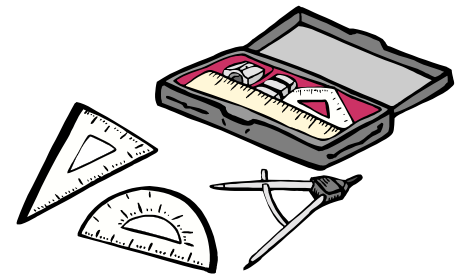
Children's Engineering



A Teacher Resource Guide for Design and Technology in Grades K-5



Commonwealth of Virginia
Department of Education
Richmond, Virginia



Children's Engineering

A Teacher Resource Guide
for Design and Technology
in Grades K-5

Produced by
Virginia Council on Elementary School Technology Education

In cooperation with
Technology Education Service
Virginia Department of Education
P.O. Box 2120
Richmond, Virginia 23218-2120

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Foreword

Children's Engineering: A Teacher Resource Guide for Design and Technology in Grades K-5 identifies technology-based experiences that enhance the content of selected Standards of Learning in English, mathematics, science, and history and social science. The experiences enable teachers to introduce children in grades K-5 to the technological world around them. The document is designed to be a companion to the Standards of Learning and a resource for enhancing the locally developed curriculum.

Each experience is intended to reinforce specific Standards of Learning. Additionally, these experiences have been correlated to the *Standards for Technological Literacy: Content for the Study of Technology*. The experiences promote critical thinking and problem-solving abilities, and they build upon a child's capability to retain content described in the Standards of Learning.

The resource guide is arranged by grade level. Each grade level contains four experiences; each experience is focused on a different subject area. The supporting resources in each experience consist of a design brief, a teacher resource page, a guided portfolio, and an assessment rubric.

This document provides teachers with the instructional materials they need to implement each experience. The majority of the supplies and materials that are needed to implement the experiences are readily available in most elementary classrooms. The instructional pages are child-friendly and ready to copy. Target and supporting Standards of Learning are specified on all materials to illustrate the academic strength inherent in K-5 technology education experiences. The document has been carefully written to ensure the experiences are age appropriate. Each experience has been crafted to build increasingly sophisticated concepts, knowledge, and ability as children mature. We hope you will enjoy using this document and that it will be a worthwhile experience for all children in grades K-5.

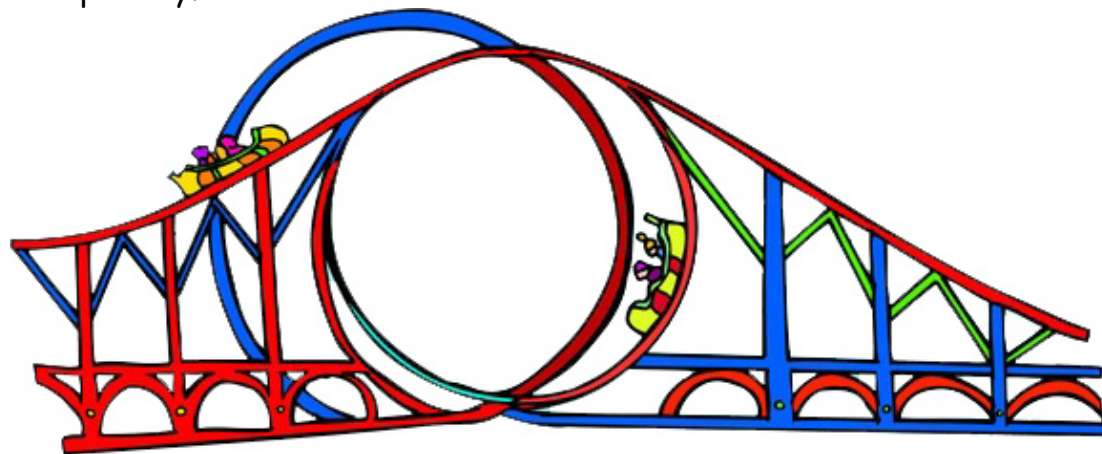
George R. Willcox
Program Specialist
Technology Education Service

Preparing Children for a Technological World

Humans have been called the animals that make things, and at no time in history has that been so apparent as the present. Today, every human activity is dependent upon various tools, machines, and systems, from growing food and providing shelter to communication, healthcare, and entertainment. Some machines, like the tractor, make more efficient activities that humans have done for hundreds or thousands of years. Others, such as the airplane or the Internet, make possible things that humans have never been able to do before. This collection of devices, capabilities, and the knowledge that accompanies them is called technology.

Broadly speaking, technology is how people modify the natural world to suit their own purposes. From the Greek word *techne*, meaning art or artifice or craft, technology literally means the act of making or crafting, but more generally it refers to the diverse collection of processes and knowledge that people use to extend human abilities and to satisfy human needs and wants.

Children's Engineering: A Teacher Resource Guide for Design and Technology in Grades K-5 combines selected core content in the Standards of Learning and technology experiences to assist children in developing their ability to use, create, control, and assess technology. With the growing importance of technology to our society, it is vital that every child receive an education that emphasizes technological capability.



Quick Hints for Getting Started

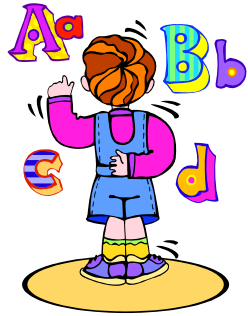
Listed below are some quick hints that might help classroom teachers implement the activity packages:

- Read the design brief *before* reading the teacher resource page. It will help in your understanding of the activity.
- Materials should be limited to the items on the design brief. Teachers may make substitutions or eliminate items that are unavailable. Students may *not* make any substitutions or use more material than specified.
- Challenges can usually be completed in more than one way. Students are encouraged to use the allowed materials in varied and unusual ways.
- Collaboration among group members is stressed.
- Organize the materials for groups by placing them in bags, in boxes, or on trays. This speeds up transition time between lessons and improves time on task.
- Oral presentations are to be presented by groups after a project has been completed. This can be done as an English lesson even if the activity's target is math, science, or history. Rubrics for oral communication skills are included for grades 2 through 5.
- Reading comprehension is an important aspect of each activity in the upper grades. Encourage each group of students to read through the design brief, guided portfolio, and the project rubric if they have trouble understanding the challenge. Teamwork is encouraged.
- Challenges contain supporting Standards of Learning from various areas of the curriculum. This provides the opportunity for the classroom teacher to integrate the project sessions into several curriculum areas. Lesson planning strategy should be guided by the target and supporting Standards of Learning of each activity.

Design Brief Titles

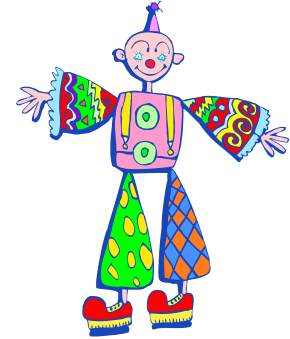
Kindergarten

- Building a Letter
- Shapes All Around Us
- Magnet Motion
- Old-Fashioned Paper Dolls



Third Grade

- Famous Historical Figures
- Geometric Creatures
- Exploring Animal Environments
- Shipping Across the Centuries



First Grade

- Exploring Homophones
- Math Fact Family Map
- Solar Cooking
- Past and Present



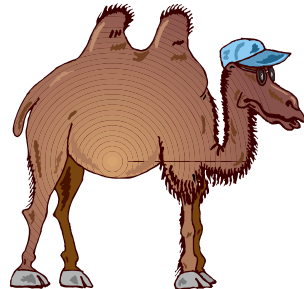
Fourth Grade

- The Virginia Company of London Wants You!
- Pack Your Trunk
- Light Your Way
- Understanding Life in Jamestown



Second Grade

- Dog Biscuit Delivery
- Ancient Construction
- High Flying Balloons
- A Chair for Mom



Fifth Grade

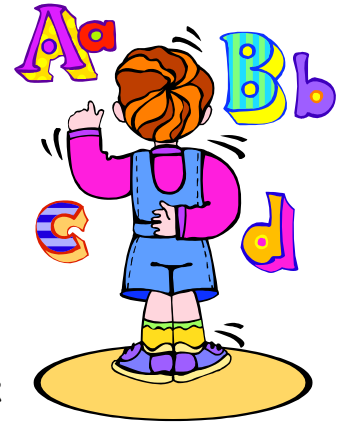
- Build a Bridge
- Playground Construction
- Music Makers
- Model of a Colony



Acknowledgements

Building a Letter

Based on the book
Albert's Alphabet by Leslie Tryon



Background: In the book Albert's Alphabet, Albert designs and builds all the letters of the alphabet, using tools and scraps. A playground and path are then lined with the letters.

Design Challenge: Build a letter of the alphabet that will stand by itself. Be ready to present your work to the class.

Criteria:

- The letter must be freestanding.
- It must be made from materials found in the classroom.

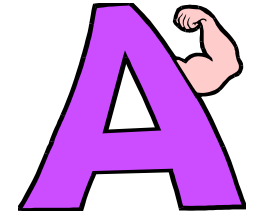
Materials: You may select from the items below.

- cardboard
- straight edge
- scrap paper/cloth
- tape
- brads
- hole punch
- boxes
- stapler
- scissors/cutting tools
- wood and wooden dowels
- string
- writing and drawing tools
- glue

Targeted Standard of Learning: English K.7a
Supporting Standards of Learning: English K.1, K.2, K.3, K.5, K.6, K.7, K.8, K.10
Science K.1, K.4, K.10
Mathematics K.10

Targeted Standard for Technological Literacy: 8
Supporting Standards for Technological Literacy: 5, 9, 10, 11, 12

Building a Letter



Targeted Standard of Learning: English K.7a

- The student will identify and name both uppercase and lowercase letters of the alphabet.

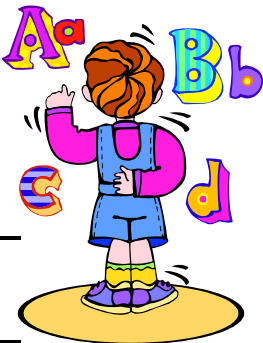
Targeted Standard for Technological Literacy: Standard 8

- Students will develop an understanding of the attributes of design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none">• Shapes of letters• Uppercase and lowercase letters	<ul style="list-style-type: none">• <u>Albert's Alphabet</u> by Leslie Tryon• Check Design Brief for suggested materials.• Teacher may substitute materials.	<ul style="list-style-type: none">• Correct use of cutting tools	<ul style="list-style-type: none">• Small groups or individual	<ul style="list-style-type: none">• Design Brief• Guided Portfolio (Optional)• Rubric Assessment	<ul style="list-style-type: none">• Session 1 Introducing Design Brief and Portfolio (30 min.)• Sessions 2 and 3: Building (30 min.)• Session 4: Sharing and evaluating

Name _____

Building a Letter



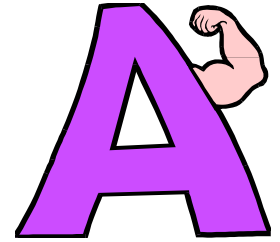
Group Members: _____

1. What is the problem? State the problem in *your own words*.

Targeted Standard of Learning: English K.7a
Supporting Standards of Learning: English K.1, K.2, K.3, K.5, K.6, K.7, K.8, K.9, K.10
Science K.1, K.4, K.10
Mathematics K.10

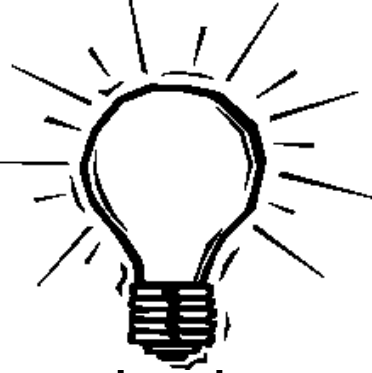
Targeted Standard for Technological Literacy: 8
Supporting Standards for Technological Literacy: 5, 9, 10, 11, 12

Name _____

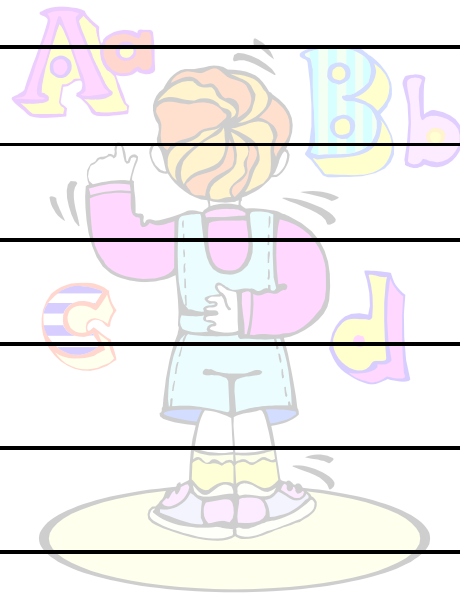
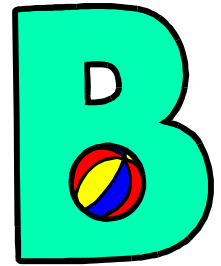


2. Brainstorm solutions.

Draw or describe some possible solutions.



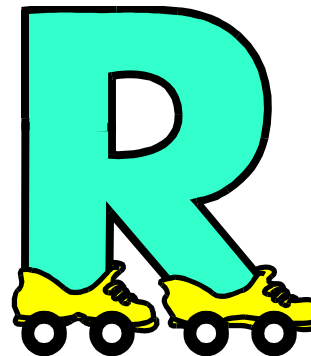
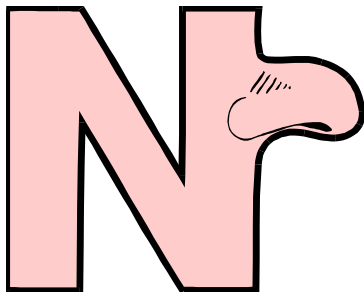
Keep notes below about the problems you have and how you solve them.



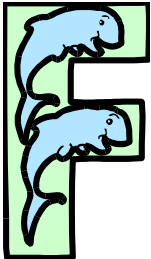
Name _____

4. Test your solution.

- Is your design based on an alphabet letter? YES NO
- Does your letter stand up by itself? YES NO
- What letter is your design based on? _____



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Building a Letter*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student					
<input type="checkbox"/> used complete sentences					
<input type="checkbox"/> used descriptive words.					
Guided Portfolio: The student					
<input type="checkbox"/> restated the problem					
<input type="checkbox"/> brainstormed solutions					
<input type="checkbox"/> created a solution					
<input type="checkbox"/> tested the solution					
<input type="checkbox"/> evaluated the solution.					
Team Skills: The student					
<input type="checkbox"/> used appropriate voice					
<input type="checkbox"/> encouraged team members					
<input type="checkbox"/> listened to team members					
<input type="checkbox"/> was involved in all aspects of the project					
<input type="checkbox"/> respected team members.					

Tested Criteria		
The design represented a letter of the alphabet.	Yes	No
The letter was freestanding.	Yes	No
The student used materials from the classroom.	Yes	No



Standards of Learning

English (2002)

Oral Language

- K.1 The student will demonstrate growth in the use of oral language.
- a) Listen to a variety of literary forms, including stories and poems.
 - b) Participate in choral speaking and recite short poems, rhymes, songs, and stories with repeated patterns.
 - c) Participate in creative dramatics.
 - d) Begin to discriminate between spoken sentences, words, and syllables.
 - e) Recognize rhyming words.
 - f) Generate rhyming words in a rhyming pattern.
- K.2 The student will use listening and speaking vocabularies.
- a) Use number words.
 - b) Use words to describe/name people, places, and things.
 - c) Use words to describe location, size, color, and shape.
 - d) Use words to describe actions.
 - e) Ask about words not understood.
 - f) Follow one-step and two-step directions.
 - g) Begin to ask how and why questions.
- K.3 The student will build oral communication skills.
- a) Begin to follow implicit rules for conversation, including taking turns and staying on topic.
 - b) Express ideas and needs in complete sentences.
 - c) Begin to use voice level, phrasing, and intonation appropriate for language situation.
 - d) Listen and speak in informal conversations with peers and adults.
 - e) Begin to initiate conversations.
 - f) Participate in discussions about books and specific topics.

Reading

- K.5 The student will understand how print is organized and read.
- a) Hold print materials in the correct position.
 - b) Identify the front cover, back cover, and title page of a book.
 - c) Follow words from left to right and top to bottom on a printed page.
 - d) Match voice with print: syllables, words, and phrases.
- K.6 The student will demonstrate an understanding that print makes sense.
- a) Explain that printed materials provide information.
 - b) Identify common signs and logos.
 - c) Read ten high-frequency words.
 - d) Read and explain own writing and drawings.

English (2002), continued

- K.7 The student will develop an understanding of basic phonetic principles.
- a) Identify and name both uppercase and lowercase letters of the alphabet.
 - b) Match consonant and short vowel sounds to appropriate letters.
 - c) Identify beginning consonant sounds in single-syllable words.
- K.8 The student will demonstrate comprehension of fiction and nonfiction.
- a) Use pictures to make predictions about content.
 - b) Retell familiar stories using beginning, middle, and end.
 - c) Discuss characters, setting, and events.
 - d) Use story language in discussions and retellings.
 - e) Identify what an author does and what an illustrator does.
 - f) Identify the topics of nonfiction selections.

Writing

- K.9 The student will print the uppercase and lowercase letters of the alphabet independently.
- K.10 The student will print his/her first and last names.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- K.1 The student will conduct investigations in which
- a) basic properties of objects are identified by direct observation;
 - b) observations are made from multiple positions to achieve different perspectives;
 - c) objects are described both pictorially and verbally;
 - d) a set of objects is sequenced according to size;
 - e) a set of objects is separated into two groups based on a single physical attribute;
 - f) nonstandard units are used to measure common objects;
 - g) a question is developed from one or more observations;
 - h) picture graphs are constructed using 10 or fewer units;
 - i) an unseen member in a sequence of objects is predicted; and
 - j) unusual or unexpected results in an activity are recognized.

Matter

- K.4 The student will investigate and understand that the position, motion, and physical properties of an object can be described. Key concepts include
- a) colors (red, orange, yellow, green, blue, purple), white, and black;
 - b) shapes (circle, triangle, square, and rectangle) and forms (flexible/stiff, straight/curved);
 - c) textures (rough/smooth) and feel (hard/soft);
 - d) relative size and weight (big/little, large/small, heavy/light, wide/thin, long/short); and
 - e) position (over/under, in/out, above/below, left/right) and speed (fast/slow).

Science (2003) continued

Resources

- K.10 The student will investigate and understand that materials can be reused, recycled, and conserved. Key concepts include
- a) materials and objects that can be used over and over again;
 - b) everyday materials can be recycled; and
 - c) water and energy conservation at home and in school helps preserve resources for future use.

Mathematics (2001)

Measurement

- K.10 The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, block.

Standards for Technological Literacy

- Standard 5: Students will develop an understanding of the effects of technology on the environment.
- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- Standard 11: Students will develop the abilities to apply the design process.
- Standard 12: Students will develop the abilities to use and maintain technological products and systems.

Shapes All Around Us



Background: Shapes are all around us in our environment. There is not just one shape that makes up our world; there are many including triangles, squares, rectangles, circles, ovals, and diamonds. You may find even more than that!

Design Challenge: After completing the "Shape Hunt," use a computer drawing program to create a picture made from different shapes. You will share your work.

Criteria:

- You must use the computer to make your shapes.
- You must use circles, squares, rectangles, and triangles.
- The shapes must make a complete picture.
- You must use the computer to add color.
- Your name must be on the page.

Materials: You may select from the items below.

- Shape books
- Computer
- Paper
- Scissors
- Paste



Targeted Standard of Learning: Mathematics K.11
Supporting Standards of Learning: Mathematics K.1, K.12, K.13, K.14, K.15
Science K.1, K.4
English K.1, K.2, K.3, K.6, K.11, K.12

Targeted Standard for Technological Literacy: 8
Supporting Standards for Technological Literacy: 3, 9, 10, 11, 17

Shapes All Around Us



Targeted Standard of Learning: Mathematics K.11

- The student will identify, describe, and draw two-dimensional (plane) geometric figures (circle, triangle, square, and rectangle).

Targeted Standard for Technological Literacy: Standard 8

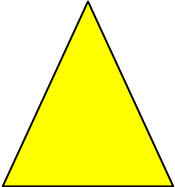
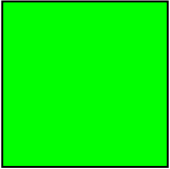
- Students will develop an understanding of the attributes of design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Books about shapes Shape names Graphs Using computer, mouse, and program for drawing 1:1 correspondence 	<ul style="list-style-type: none"> Check Design Brief for recommended materials Teacher may substitute materials. 	<ul style="list-style-type: none"> Proper computer usage 	<ul style="list-style-type: none"> Individual or partners The Shape Hunt can be a whole-class event or a group event. 	<ul style="list-style-type: none"> Design Brief Shape Hunt sheet Guided Portfolio Graphing chart Rubric Assessment 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and completing Shape Hunt (20 min.) Session 2: Building (30 min.) Session 3: Graphing shapes used (20 min.) Session 4: Sharing and evaluating

Name _____

Shape Hunt

Write a tally mark each time you see one of these shapes in everyday objects. For example, the computer screen may be shaped like a square, so on the sheet you would write a tally mark on the row with the square.

Name _____



Shapes All Around Us

Group Members: _____

1. What is the problem? State the problem in *your own words*.

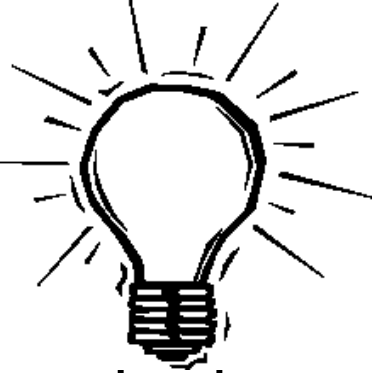
Target Standard of Learning: Mathematics K.11
Supporting Standards of Learning: Mathematics K.1, K.12, K.13, K.14, K.15
Science K.1, K.4
English K.1, K.2, K.3, K.6, K.11, K.12

Target Standard for Technological Literacy: 8
Supporting Standards for Technological Literacy: 3, 9, 10, 11, 17

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.





A cartoon illustration of a person with blonde hair, wearing a purple shirt and blue pants, sitting at a desk and writing on a notepad with a pencil. A clock on the wall shows the time is approximately 1:50. The background is white with horizontal ruling lines.

Name _____

4. Test your solution.

- Did you use a circle?
- Did you use a square?
- Did you use a triangle?
- Did you use a rectangle?
- Does your picture have color?
- Is your picture complete?
- Did you use the computer?

YES

NO

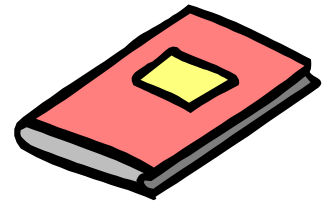


YES

NO

YES

NO

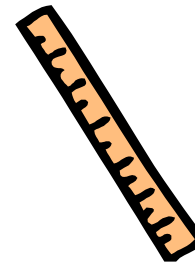


YES

NO

YES

NO



YES

NO

YES

NO

Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____

Picture Graph

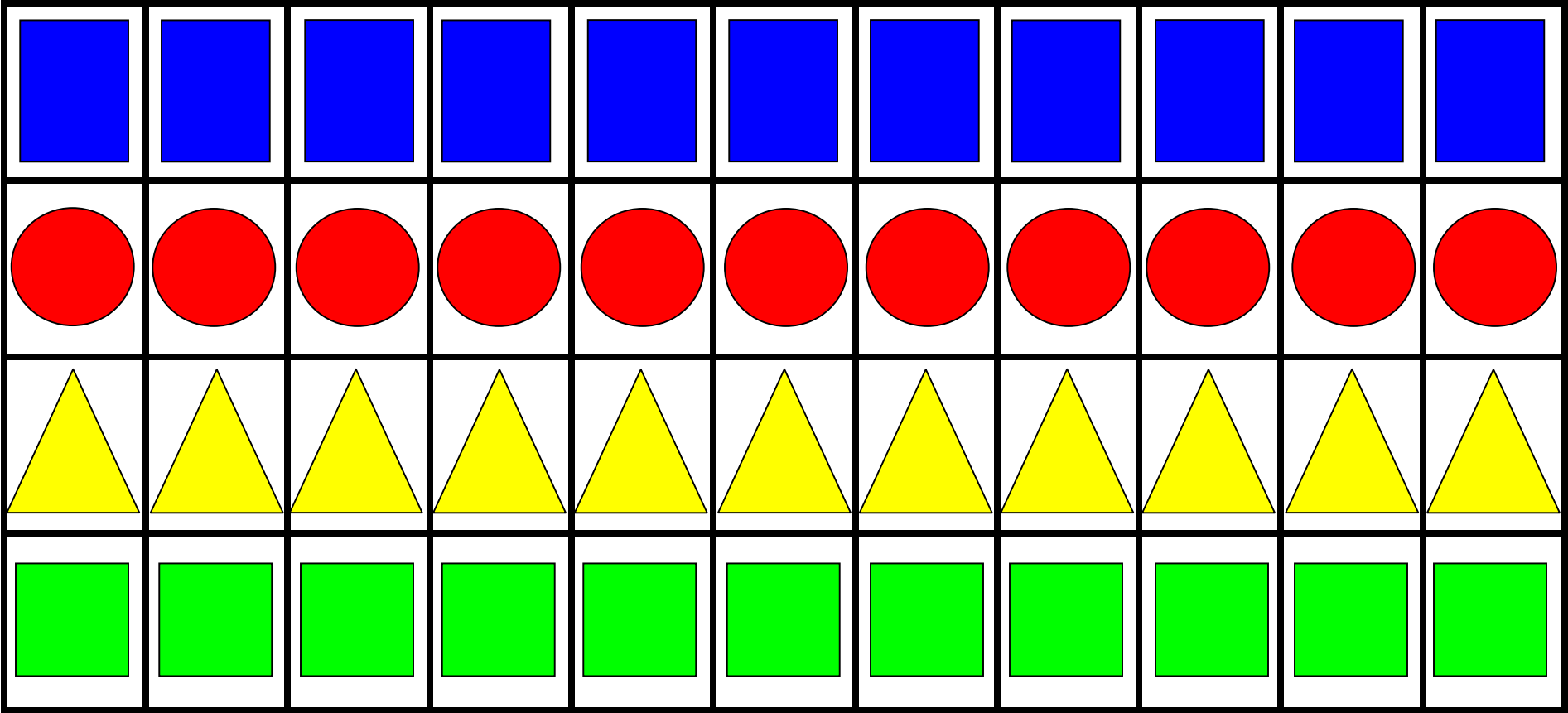
Shapes All Around Us

Using the shapes on the following page, paste the number of each shape you used in your computer drawing.

Name _____

Picture Graph

Cut out the shapes on this page to create your graph on the previous page.



Rubric for *Shapes All Around Us*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student					
• used complete sentences					
• used descriptive words.					
Guided Portfolio: The student					
• restated the problem					
• brainstormed solutions					
• created a solution					
• tested the solution					
• evaluated the solution.					
Team Skills: The student					
• used appropriate voice					
• encouraged team members					
• listened to team members					
• was involved in all aspects of the project					
• respected team members.					

Tested Criteria		
The student used a computer to design.	Yes	No
The student added color to picture.	Yes	No
The student used a circle, a triangle, a rectangle, and a square.	Yes	No
The student made a complete picture.	Yes	No



Standards of Learning

English (2002)

Oral Language

- K.1 The student will demonstrate growth in the use of oral language.
- a) Listen to a variety of literary forms, including stories and poems.
 - b) Participate in choral speaking and recite short poems, rhymes, songs, and stories with repeated patterns.
 - c) Participate in creative dramatics.
 - d) Begin to discriminate between spoken sentences, words, and syllables.
 - e) Recognize rhyming words.
 - f) Generate rhyming words in a rhyming pattern.
- K.2 The student will use listening and speaking vocabularies.
- a) Use number words.
 - b) Use words to describe/name people, places, and things.
 - c) Use words to describe location, size, color, and shape.
 - d) Use words to describe actions.
 - e) Ask about words not understood.
 - f) Follow one-step and two-step directions.
 - g) Begin to ask how and why questions.
- K.3 The student will build oral communication skills.
- a) Begin to follow implicit rules for conversation, including taking turns and staying on topic.
 - b) Express ideas and needs in complete sentences.
 - c) Begin to use voice level, phrasing, and intonation appropriate for language situation.
 - d) Listen and speak in informal conversations with peers and adults.
 - e) Begin to initiate conversations.
 - f) Participate in discussions about books and specific topics.

Reading

- K.6 The student will demonstrate an understanding that print makes sense.
- a) Explain that printed materials provide information.
 - b) Identify common signs and logos.
 - c) Read ten high frequency words.
 - d) Read and explain own writing and drawings.

English (2002), continued

Writing

- K.11 The student will write to communicate ideas.
- a) Draw pictures and/or use letters and phonetically spelled words to write about experiences, stories, people, objects, or events.
 - b) Write left to right and top to bottom.
- K.12 The student will explore the uses of available technology for reading and writing.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- K.1 The student will conduct investigations in which
- a) basic properties of objects are identified by direct observation;
 - b) observations are made from multiple positions to achieve different perspectives;
 - c) objects are described both pictorially and verbally;
 - d) a set of objects is sequenced according to size;
 - e) a set of objects is separated into two groups based on a single physical attribute;
 - f) nonstandard units are used to measure common objects;
 - g) a question is developed from one or more observations;
 - h) picture graphs are constructed using 10 or fewer units;
 - i) an unseen member in a sequence of objects is predicted; and
 - j) unusual or unexpected results in an activity are recognized.

Matter

- K.4 The student will investigate and understand that the position, motion, and physical properties of an object can be described. Key concepts include
- a) colors (red, orange, yellow, green, blue, purple), white, and black;
 - b) shapes (circle, triangle, square, and rectangle) and forms (flexible/stiff, straight/curved);
 - c) textures (rough/smooth) and feel (hard/soft);
 - d) relative size and weight (big/little, large/small, heavy/light, wide/thin, long/short); and
 - e) position (over/under, in/out, above/below, left/right) and speed (fast/slow).

Mathematics (2001)

Number and Number Sense

- K.1 The student, given two sets containing 10 or fewer concrete items, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one - to - one correspondence.

Geometry

- K.11 The student will identify, describe, and draw two-dimensional (plane) geometric figures (circle, triangle, square, and rectangle).
- K.12 The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their position and orientation in space.

Mathematics (2001), continued

K.13 The student will compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle).

Probability and Statistics

K.14 The student will gather data relating to familiar experiences by counting and tallying.

K.15 The student will display objects and information, using objects graphs, pictorial graphs and tables.

Standards for Technological Literacy

Standard 3: Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

Standard 8: Students will develop an understanding of the attributes of design.

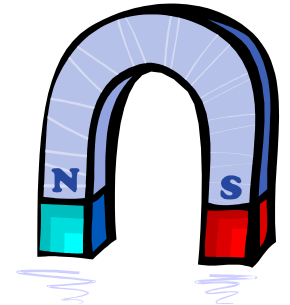
Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Standard 11: Students will develop the abilities to apply the design process.

Standard 17: Students will develop an understanding of and be able to select and use information and communication technologies.

Magnet Motion



Background: Magnets can be used to create motion. They can pull something (attract) or push something (repel). Magnets attract or repel only certain metals.

Design Challenge: Design an object that can be pushed or pulled on a course by using magnets. You may not touch the object. You will present your work to the class.

Criteria:

- The object must have a path or a course to follow.
- Magnets must be used.
- The object must represent something, and the path must relate to the object.

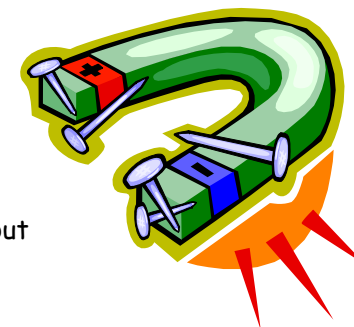
Materials: You may select from the items below.

- | | | |
|-------------------|----------------------|-----------------------|
| • magnetic tape | • scrap paper | • small magnet rounds |
| • cardboard | • scrap fabric | • markers/crayons |
| • cardboard tubes | • construction paper | • pencils |
| • scissors | • tape | • glue |

Targeted Standard of Learning: Science K.3
Supporting Standards of Learning: Science K.1, K.4, K.10
Mathematics K.12
English K.2, K.3, K.8, K.10, K.11

Targeted Standard for Technological Literacy: 16
Supporting Standards for Technological Literacy: 5, 8, 11, 12

Magnet Motion



Targeted Standard of Learning: Science K.3

- The student will investigate and understand that magnets have an effect on some materials, make some things move without touching them, and have useful applications.

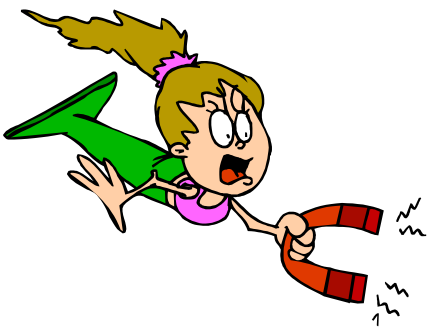
Targeted Standard for Technological Literacy: Standard 16

- Students will develop an understanding of and be able to select and use energy and power technologies.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to vocabulary: <i>repel, attract, push, pull, metal, nonmetal, attraction/non-attraction</i> Exposure to magnet principles Shared books on magnets 	<ul style="list-style-type: none"> Magnets Games using magnets Use recyclables: cardboard, scraps, and fabrics Check Design Brief for recommended materials. Teacher may substitute materials. 	<ul style="list-style-type: none"> Use of scissors 	<ul style="list-style-type: none"> Small groups of two to four Materials can be placed in paper bags and labeled by groups so that work in progress and materials can all stay together. Clean up is easier, and less distribution time is required. 	<ul style="list-style-type: none"> Design Brief Guided portfolio (optional use) Rubrics Assessment 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief Sessions 2 & 3: Building Session 4: Sharing and evaluating

Guided Portfolio—1
Name _____

Magnet Motion



Group Members: _____

1. What is the problem? State the problem in *your own words*.

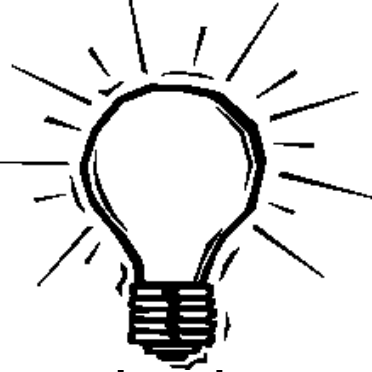
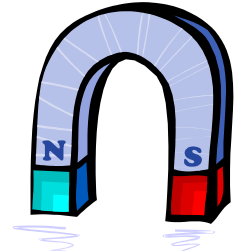
Targeted Standard of Learning: Science K.3
Supporting Standards of Learning: Science K.1, K.4, K.10
Mathematics K.12
English K.2, K.3, K.8, K.10, K.11

Targeted Standard for Technological Literacy: 16
Supporting Standards for Technological Literacy: 5, 8, 11, 12

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.





A cartoon drawing of a blonde girl with a surprised expression, running to the right. She is wearing a pink top and holding a large, orange and red striped object. A large green arrow points to the right behind her, indicating the direction of movement. The drawing is positioned in the center of the page, between the first and second sets of horizontal lines.

Name _____

4. Test your solution.

- Did your object move without being touched?
- Did you have a path or course for your object to follow?
- Did you use magnets?
- How many magnets did you use?

YES

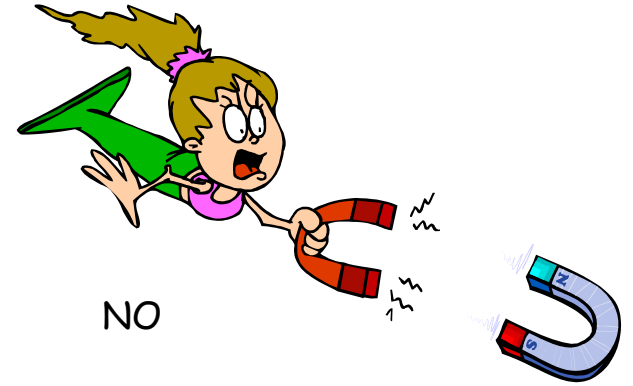
NO

YES

NO

YES

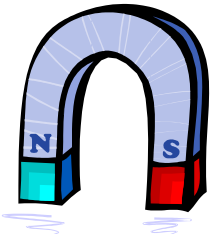
NO



Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Magnet Motion*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student <ul style="list-style-type: none"> used complete sentences used descriptive words. 					
Guided Portfolio: The student <ul style="list-style-type: none"> restated the problem brainstormed solutions created a solution tested the solution evaluated the solution. 					
Team Skills: The student <ul style="list-style-type: none"> used appropriate voice encouraged team members listened to team members was involved in all aspects of the project respected team members. 					

Tested Criteria		
The student used magnets in project.	Yes	No
The student designed a course or path.	Yes	No
The student could move object without touching it.	Yes	No



Standards of Learning

English (2002)

Oral Language

- K.2 The student will use listening and speaking vocabularies.
- a) Use number words.
 - b) Use words to describe/name people, places, and things.
 - c) Use words to describe location, size, color, and shape.
 - d) Use words to describe actions.
 - e) Ask about words not understood.
 - f) Follow one-step and two-step directions.
 - g) Begin to ask how and why questions.
- K.3 The student will build oral communication skills.
- a) Begin to follow implicit rules for conversation, including taking turns and staying on topic.
 - b) Express ideas and needs in complete sentences.
 - c) Begin to use voice level, phrasing, and intonation appropriate for language situation.
 - d) Listen and speak in informal conversations with peers and adults.
 - e) Begin to initiate conversations.
 - f) Participate in discussions about books and specific topics.

Reading

- K.8 The student will demonstrate comprehension of fiction and nonfiction.
- a) Use pictures to make predictions about content.
 - b) Retell familiar stories using beginning, middle, and end.
 - c) Discuss characters, setting, and events.
 - d) Use story language in discussions and retellings.
 - e) Identify what an author does and what an illustrator does.
 - f) Identify the topics of nonfiction selections.

Writing

- K.10 The student will print his/her first and last names.
- K.11 The student will write to communicate ideas.
- a) Draw pictures and/or use letters and phonetically spelled words to write about experiences, stories, people, objects, or events.
 - b) Write left to right and top to bottom.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- K.1 The student will conduct investigations in which
- a) basic properties of objects are identified by direct observation;
 - b) observations are made from multiple positions to achieve different perspectives;
 - c) objects are described both pictorially and verbally;
 - d) a set of objects is sequenced according to size;
 - e) a set of objects is separated into two groups based on a single physical attribute;
 - f) nonstandard units are used to measure common objects;
 - g) a question is developed from one or more observations;
 - h) picture graphs are constructed using 10 or fewer units;
 - i) an unseen member in a sequence of objects is predicted; and
 - j) unusual or unexpected results in an activity are recognized.

Force, Motion, and Energy

- K.3 The student will investigate and understand that magnets have an effect on some materials, make some things move without touching them, and have useful applications. Key concepts include
- a) attraction/nonattraction, push/pull, attract/repel, and metal/nonmetal; and
 - b) useful applications (refrigerator magnet, can opener, magnetized screwdriver, and magnetic games).

Matter

- K.4 The student will investigate and understand that the position, motion, and physical properties of an object can be described. Key concepts include
- a) colors (red, orange, yellow, green, blue, purple), white, and black;
 - b) shapes (circle, triangle, square, and rectangle) and forms (flexible/stiff, straight/curved);
 - c) textures (rough/smooth) and feel (hard/soft);
 - d) relative size and weight (big/little, large/small, heavy/light, wide/thin, long/short); and
 - e) position (over/under, in/out, above/below, left/right) and speed (fast/slow).

Resources

- K.10 The student will investigate and understand that materials can be reused, recycled, and conserved. Key concepts include
- a) materials and objects that can be used over and over again;
 - b) everyday materials can be recycled; and
 - c) water and energy conservation at home and in school helps preserve resources for future use.

Mathematics (2001)

Geometry

- K.12 The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their position and orientation in space.

Standards for Technological Literacy

Standard 5: Students will develop an understanding of the effects of technology on the environment.

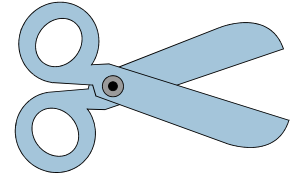
Standard 8: Students will develop an understanding of the attributes of design.

Standard 11: Students will develop the abilities to apply the design process.

Standard 12: Students will develop the abilities to use and maintain technological products and systems.

Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.

Old-Fashioned Paper Dolls



Background: During our study of historical events, we saw many pictures. We learned that some of our holidays are based on events a long time ago. The class discussed the similarities and differences of people today and people of long ago. One of the most notable differences was the clothing styles from the days of Pocahontas, George Washington, Abraham Lincoln, and Betsy Ross to now.

Design Challenge: Design an old-fashioned paper doll that can be dressed to reflect its time period. You will be asked to tell your classmates about your paper doll.

Criteria:

- Your paper doll should stand alone.
- You must have two complete outfits.
- Your doll must be neatly decorated.
- The clothes must be changeable.



Materials: You may select from the items below.

- paper doll pattern
- scrap fabric
- scissors
- paper scraps
- wall paper sample books
- yarn
- markers, colored pencils, crayons, and glue
- pictures

Targeted Standard of Learning: History and Social Science K.2
Supporting Standards of Learning: History and Social Science K.1a
Science K.1, K.9
English K.1, K.2b, K.3, K.8, K.11a,

Targeted Standard for Technological Literacy: 7
Supporting Standards for Technological Literacy: 1, 3, 5, 6, 8, 9

Old-Fashioned Paper Dolls



Targeted Standard of Learning: History and Social Science K.2

- The student will describe everyday life in the present and in the past and begin to recognize that things change over time.

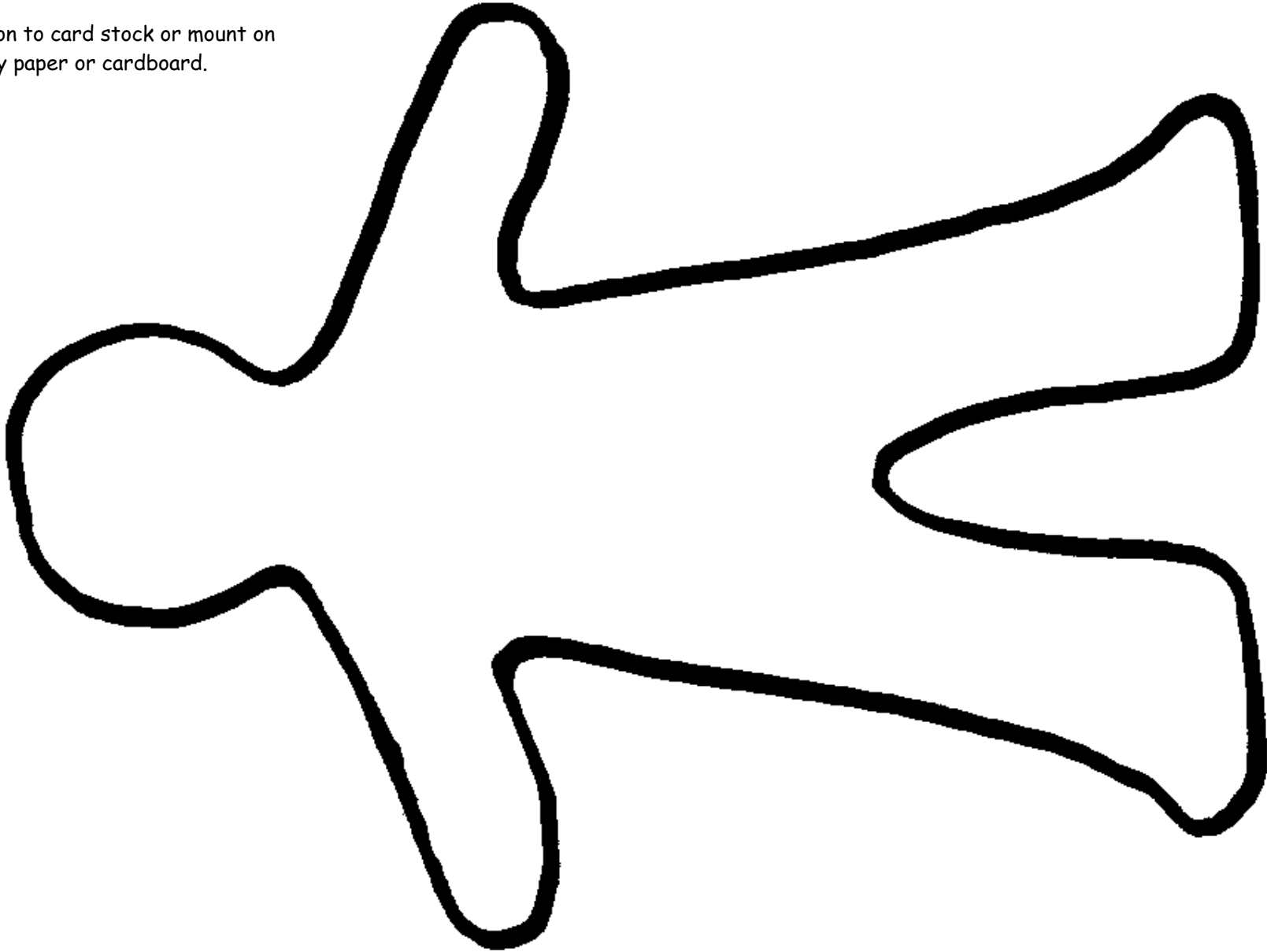
Targeted Standard for Technological Literacy: Standard 7

- Students will develop an understanding of the influence of technology on history.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Historical events • Historical people • Pictures of events 	<ul style="list-style-type: none"> • Check Design Brief for recommended materials. Teacher may substitute materials. • Can discuss ways to attach clothes, but it is often better to see what the student can create, or to offer a variety of paper doll samples. 	<ul style="list-style-type: none"> • Use of scissors 	<ul style="list-style-type: none"> • Individual (recommended) • Partners or groups 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio (optional use) • Rubric Assessment • Doll Pattern 	<ul style="list-style-type: none"> • Session 1: Introducing Design Brief (20 min.) • Sessions 2 and 3: Building (20-30 min.) • Session 4: Sharing and evaluating (20 min.)

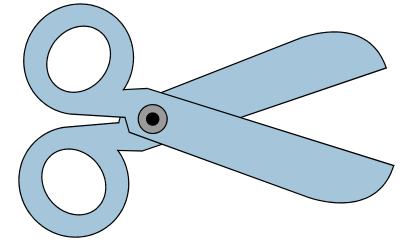
Old Fashioned Paper Doll Pattern

Copy on to card stock or mount on sturdy paper or cardboard.



Name _____

Old-Fashioned Paper Dolls



Group Members: _____

1. What is the problem? State the problem in *your own words*.

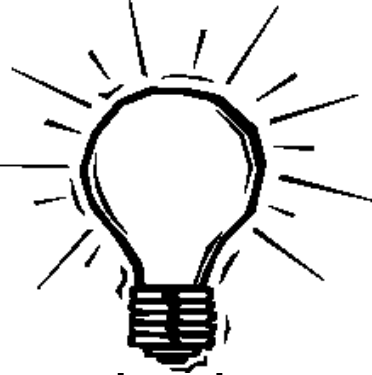
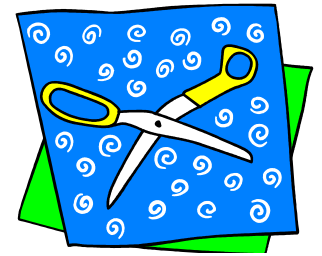
Targeted Standard of Learning: History and Social Science K.2
Supporting Standards of Learning: History and Social Science K.1a
Science K.1, K.9
English K.1, K.2b, K.3, K.8, K.11a,

Targeted Standard for Technological Literacy: 7
Supporting Standards for Technological Literacy: 1, 3, 5, 6, 8, 9

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.





Keep notes below about the problems you have and how you solve them.

Name _____

4. Test your solution.

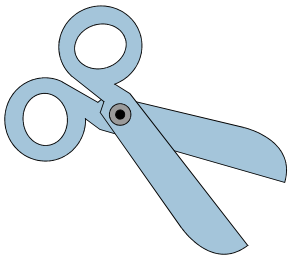
- | | | |
|---|-----|----|
| • Does your paper doll have two sets of clothing? | YES | NO |
| • Does your paper doll stand? | YES | NO |
| • Does the clothing reflect the doll's time period? | YES | NO |
| • Can you change the clothes on your doll? | YES | NO |



Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Old-Fashioned Paper Dolls*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student <ul style="list-style-type: none"> used complete sentences used descriptive words. 					
Guided Portfolio: The student <ul style="list-style-type: none"> restated the problem brainstormed solutions created a solution tested the solution evaluated the solution. 					
Team Skills: The student <ul style="list-style-type: none"> used appropriate voice encouraged team members listened to team members was involved in all aspects of the project respected team members. 					

Tested Criteria		
The paper doll stands alone.	Yes	No
Two changes of clothes have been designed.	Yes	No
The clothing can be switched.	Yes	No
The doll is neatly decorated.	Yes	No



Standards of Learning

English (2002)

Oral Language

- K.1 The student will demonstrate growth in the use of oral language.
- a) Listen to a variety of literary forms, including stories and poems.
 - b) Participate in choral speaking and recite short poems, rhymes, songs, and stories with repeated patterns.
 - c) Participate in creative dramatics.
 - d) Begin to discriminate between spoken sentences, words, and syllables.
 - e) Recognize rhyming words.
 - f) Generate rhyming words in a rhyming pattern.
- K.2 The student will use listening and speaking vocabularies.
- a) Use number words.
 - b) Use words to describe/name people, places, and things.
 - c) Use words to describe location, size, color, and shape.
 - d) Use words to describe actions.
 - e) Ask about words not understood.
 - f) Follow one-step and two-step directions.
 - g) Begin to ask how and why questions.
- K.3 The student will build oral communication skills.
- a) Begin to follow implicit rules for conversation, including taking turns and staying on topic.
 - b) Express ideas and needs in complete sentences.
 - c) Begin to use voice level, phrasing, and intonation appropriate for language situation.
 - d) Listen and speak in informal conversations with peers and adults.
 - e) Begin to initiate conversations.
 - f) Participate in discussions about books and specific topics.

Reading

- K.8 The student will demonstrate comprehension of fiction and nonfiction.
- a) Use pictures to make predictions about content.
 - b) Retell familiar stories using beginning, middle, and end.
 - c) Discuss characters, setting, and events.
 - d) Use story language in discussions and retellings.
 - e) Identify what an author does and what an illustrator does.
 - f) Identify the topics of nonfiction selections.

English (2002) continued

Writing

- K.11 The student will write to communicate ideas.
- a) Draw pictures and/or use letters and phonetically spelled words to write about experiences, stories, people, objects, or events.
 - b) Write left to right and top to bottom.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- K.1 The student will conduct investigations in which
- a) basic properties of objects are identified by direct observation;
 - b) observations are made from multiple positions to achieve different perspectives;
 - c) objects are described both pictorially and verbally;
 - d) a set of objects is sequenced according to size;
 - e) a set of objects is separated into two groups based on a single physical attribute;
 - f) nonstandard units are used to measure common objects;
 - g) a question is developed from one or more observations;
 - h) picture graphs are constructed using 10 or fewer units;
 - i) an unseen member in a sequence of objects is predicted; and
 - j) unusual or unexpected results in an activity are recognized.

Earth Patterns, Cycles, and Change

- K.9 The student will investigate and understand that change occurs over time, and rates may be fast or slow. Key concepts include
- a) natural and human-made things may change over time; and
 - b) changes can be noted and measured.

History and Social Science (2001)

History

- K.1 The student will recognize that history describes events and people of other times and places by
- a) identifying examples of past events in legends, stories, and historical accounts of Pocahontas, George Washington, Betsy Ross, and Abraham Lincoln;
 - b) identifying the people and events honored by the holidays of Thanksgiving Day, Martin Luther King, Jr. Day, Presidents' Day, and Independence Day (Fourth of July).
- K.2 The student will describe everyday life in the present and in the past and begin to recognize that things change over time.

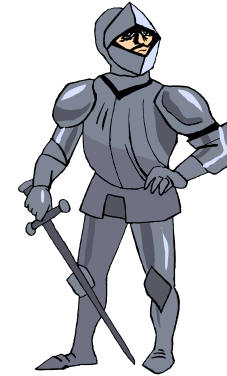
Standards for Technological Literacy

- Standard 1: Students will develop an understanding of the characteristics and scope of technology.
- Standard 3: Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
- Standard 5: Students will develop an understanding of the effects of technology on the environment.
- Standard 6: Students will develop an understanding of the role of society in the development and use of technology.
- Standard 7: Students will develop an understanding of the influence of technology on history.
- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.



Exploring Homophones

Based on the book
Night*Knight by Harriet Ziefert



Background: We have been exploring word play and words that sound the same but are spelled differently and have different meanings. We have brainstormed homophones and made a chart of them.

Design Challenge: Using a pair of homophones, make a display that connects the two homophones and that has at least one moving part that requires a lever to move. You will share this with the class.

Criteria:

- There may be more than one moving part, but you must have a lever.
- You must include a sentence using both homophones.

Materials: You may select from the items below.

- | | | |
|-----------------------|--------------|-----------------|
| • wooden craft sticks | • straws | • fabric |
| • styrofoam board | • scissors | • yarn scraps |
| • cardboard | • hole punch | • writing paper |
| • brads | • dowels | • crayons |

Targeted Standard of Learning: English 1.6
Supporting Standards of Learning: Science 1.2
English 1.1, 1.2, 1.3, 1.7, 1.12

Targeted Standard for Technological Literacy: 11
Supporting Standards for Technological Literacy: 5, 8, 9, 10, 16

Exploring Homophones



Targeted Standard of Learning: English 1.6

- The student will apply phonetic principles to read and spell.

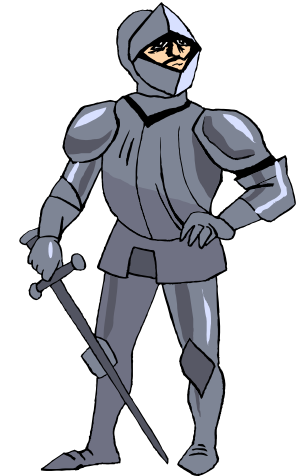
Targeted Standard for Technological Literacy: Standard 11

- Students will develop abilities to apply the design process.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Phoneme awareness • Push/pull motion • Understanding of a lever and how it works 	<ul style="list-style-type: none"> • Any homophone book such as <u>Night*Knight</u> • "Brainstormed" homophones chart • Check Design Brief for recommended materials. Teacher may substitute materials. 	<ul style="list-style-type: none"> • Use materials correctly 	<ul style="list-style-type: none"> • Individual or partner work 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio • Rubric Assessment 	<ul style="list-style-type: none"> • Session 1: Introducing book and Design Brief (20 min.) • Session 2: Building (20-40 min.) • Session 3: Sharing and evaluating

Name _____

Exploring Homophones



Group Members: _____

1. What is the problem? State the problem in *your own words*.

Targeted Standard of Learning: English 1.6
Supporting Standards of Learning: Science 1.2
English 1.1, 1.2, 1.3, 1.7, 1.12

Targeted Standard for Technological Literacy: 11
Supporting Standards for Technological Literacy: 5, 8, 9, 10, 16

Name _____



2. Brainstorm solutions.

Draw or describe some possible solutions.



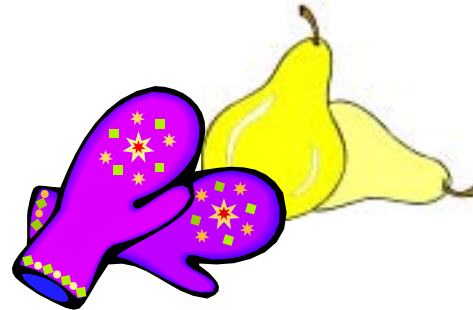


An illustration of winter-themed items: a pair of pink mittens with yellow stars and squares, and two yellow pears. The items are positioned in the lower center of the page, overlapping the horizontal lines.



4. Test your solution.

- Have you used a lever? YES NO
- Does your sentence relate to your picture and use both homophones? YES NO



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Exploring Homophones*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student <ul style="list-style-type: none"> used complete sentences used descriptive words. 					
Guided Portfolio: The student <ul style="list-style-type: none"> restated the problem brainstormed solutions created a solution tested the solution evaluated the solution. 					
Team Skills: The student <ul style="list-style-type: none"> used appropriate voice encouraged team members listened to team members was involved in all aspects of the project respected team members. 					

Tested Criteria		
The student used a lever.	Yes	No
The student used homophones in a sentence.	Yes	No



Standards of Learning

English (2002)

Oral Language

- 1.1 The student will continue to demonstrate growth in the use of oral language.
 - a) Listen and respond to a variety of media, including books, audiotapes, videos, and other age-appropriate materials.
 - b) Tell and retell stories and events in logical order.
 - c) Participate in a variety of oral language activities, including choral speaking and reciting short poems, rhymes, songs, and stories with repeated patterns.
 - d) Express ideas orally in complete sentences.
- 1.2 The student will continue to expand and use listening and speaking vocabularies.
 - a) Increase oral descriptive vocabulary.
 - b) Begin to ask for clarification and explanation of words and ideas.
 - c) Follow simple two-step oral directions.
 - d) Give simple two-step oral directions.
 - e) Use singular and plural nouns.
- 1.3 The student will adapt or change oral language to fit the situation.
 - a) Initiate conversation with peers and adults.
 - b) Follow rules for conversation.
 - c) Use appropriate voice level in small-group settings.
 - d) Ask and respond to questions in small-group settings.

Reading

- 1.6 The student will apply phonetic principles to read and spell.
 - a) Use beginning and ending consonants to decode and spell single-syllable words.
 - b) Use two-letter consonant blends to decode and spell single-syllable words.
 - c) Use beginning consonant digraphs to decode and spell single-syllable words.
 - d) Use short vowel sounds to decode and spell single-syllable words.
 - e) Blend beginning, middle, and ending sounds to recognize and read words.
 - f) Use word patterns to decode unfamiliar words.
 - g) Use compound words.
 - h) Read and spell common, high-frequency sight words, including *the*, *said*, and *come*.
- 1.7 The student will use meaning clues and language structure to expand vocabulary when reading.
 - a) Use titles and pictures.
 - b) Use knowledge of the story and topic to read words.
 - c) Use knowledge of sentence structure.
 - d) Reread and self-correct.

English (2002), continued

Writing

- 1.12 The student will write to communicate ideas.
- a) Generate ideas.
 - b) Focus on one topic.
 - c) Use descriptive words when writing about people, places, things, and events.
 - d) Use complete sentences in final copies.
 - e) Begin each sentence with a capital letter and use ending punctuation in final copies.
 - f) Use correct spelling for frequently used words and phonetically regular words in final copies.
 - g) Share writing with others.
 - h) Use available technology.

Science (2003)

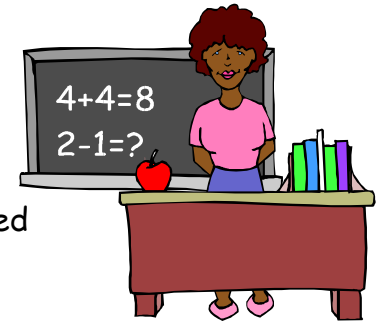
Force, Motion, and Energy

- 1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include
- a) objects may have straight, circular, and back and forth motions;
 - b) objects may vibrate and produce sound;
 - c) pushes or pulls can change the movement of an object; and
 - d) the motion of objects may be observed in toys and in playground activities.

Standards for Technological Literacy

- Standard 5: Students will develop an understanding of the effects of technology on the environment.
- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- Standard 11: Students will develop the abilities to apply the design process.
- Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.

Math Fact Family Map



Background: We have explored even and odd numbers by looking for them in our environment. We looked on a map and we saw that our houses are numbered.

Design Challenge: Complete the fact family house. The windows are your addend numbers and the door is the sum. Figure the fact family number sentences on the roof. The sum is the house number for your map. Arrange your fact family homes to create a neighborhood map, using what you know about number patterns and maps. You will share your maps with the class.

Criteria:

Each map must have

- fact family completed on roof
- a map key
- a compass rose
- house numbers that follow a pattern on the map.

Materials: You may select from the items below.

- | | | |
|---------------------------------------|------------|---------------|
| • bulletin board paper (2 yards long) | • crayons | • paper tubes |
| • markers | • scissors | • rulers |
| • construction paper | • glue | • yarn |

Targeted Standard of Learning: Mathematics 1.8
Supporting Standards of Learning: Mathematics 1.4, 1.5, 1.15, 1.21
History and Social Science 1.4b, 1.5
Science 1.1c
English 1.1, 1.2, 1.3, 1.12

Targeted Standards for Technological Literacy: 2, 9
Supporting Standards for Technological Literacy: 3, 8, 12, 18

Math Fact Family Map

$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array}$$

Targeted Standard of Learning: Mathematics 1.8

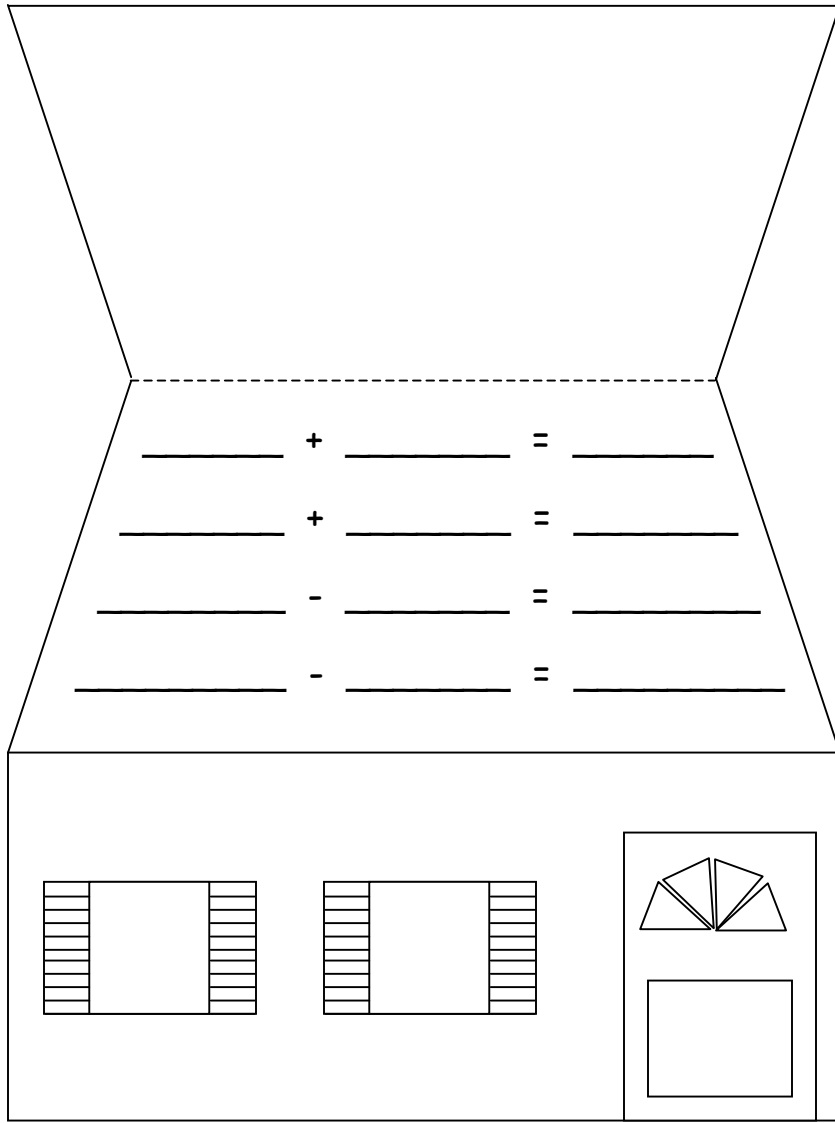
- The student will recall basic addition facts — i.e., sums to 10 or less — and the corresponding subtraction facts.

Targeted Standards for Technological Literacy: Standard 2, Standard 9

- Students will develop an understanding of the core concepts of technology.
- Students will develop an understanding of engineering design.

Prior Knowledge & Skills	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Fact family Even/odd number pattern as in house numbering Maps Map key defined Compass rose 	<ul style="list-style-type: none"> Check Design Brief for recommended materials. Teacher may substitute materials. 	<ul style="list-style-type: none"> Use of scissors 	<ul style="list-style-type: none"> Groups of three to four Can be an individual project 	<ul style="list-style-type: none"> Design Brief Guided Portfolio (optional use) Fact Family Template Rubric Assessment 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief (20 min.) Sessions 2 and 3: Building (30 min.) Session 4: Sharing and evaluating Additional sessions may be added if maps are to be detailed.

Fact Family House



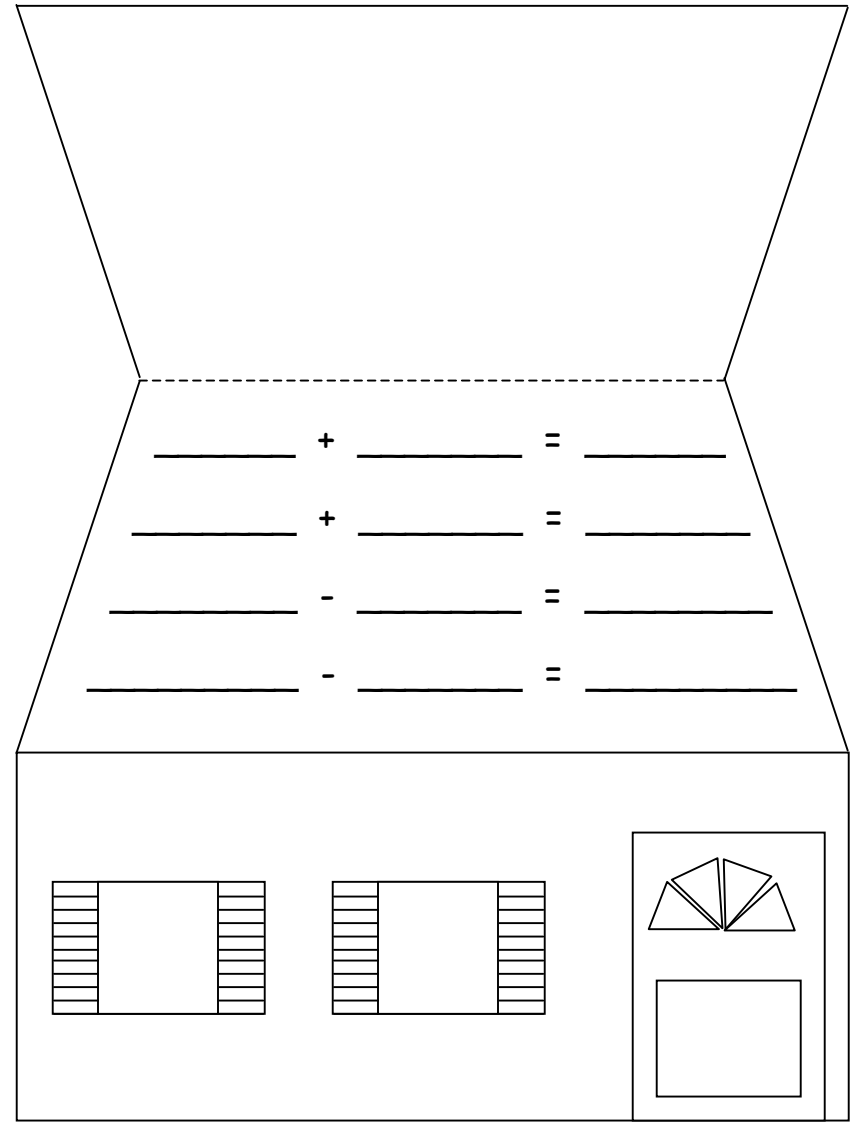
A template for a Fact Family House. The roof is a trapezoid with a dashed line across its middle. Inside the roof, there are four rows of math problems, each consisting of a blank line, a plus or minus sign, another blank line, an equals sign, and a final blank line. The first two rows are for addition, and the last two are for subtraction. The base of the house is a rectangle containing two identical ten-frame grids (each with 10 empty squares) and a small square box with a drawing of a house.

_____ + _____ = _____

_____ + _____ = _____

_____ - _____ = _____

_____ - _____ = _____



A template for a Fact Family House, identical to the one on the left. The roof is a trapezoid with a dashed line across its middle. Inside the roof, there are four rows of math problems, each consisting of a blank line, a plus or minus sign, another blank line, an equals sign, and a final blank line. The first two rows are for addition, and the last two are for subtraction. The base of the house is a rectangle containing two identical ten-frame grids (each with 10 empty squares) and a small square box with a drawing of a house.

_____ + _____ = _____

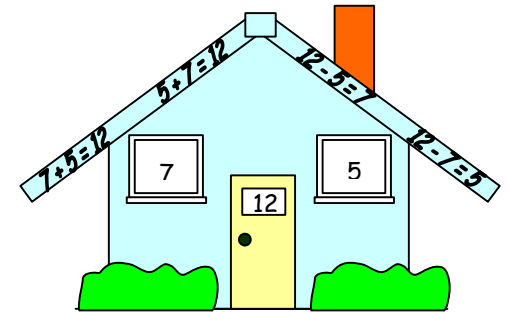
_____ + _____ = _____

_____ - _____ = _____

_____ - _____ = _____

Name _____

Math Fact Family Map



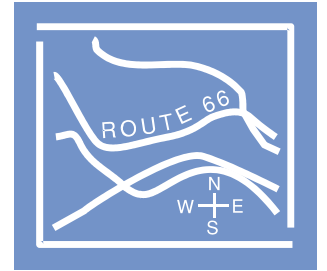
Group Members: _____

1. What is the problem? State the problem in *your own words*.

Targeted Standard of Learning: Mathematics 1.8
Supporting Standards of Learning: Mathematics 1.4, 1.5, 1.15, 1.21
History and Social Science 1.4b, 1.5
Science 1.1c
English 1.1, 1.2, 1.3, 1.12

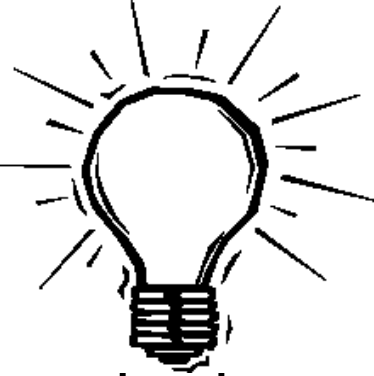
Targeted Standard for Technological Literacy: 2, 9
Supporting Standards for Technological Literacy: 3, 8, 12, 18

Name _____



2. Brainstorm solutions.

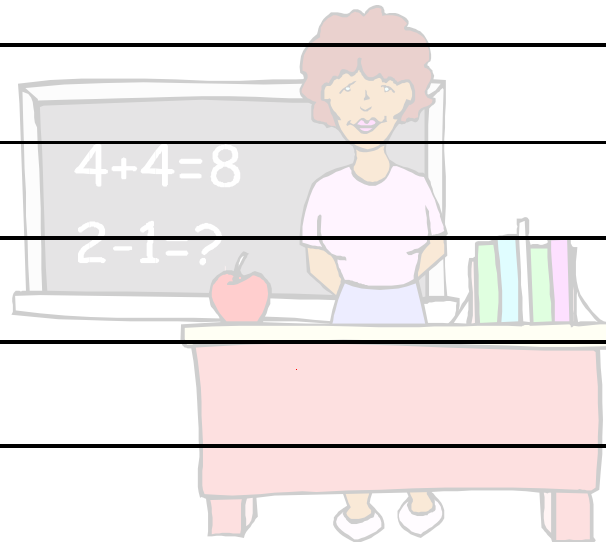
Draw or describe some possible solutions.



$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array}$$

Keep notes below about the problems you have and how you solve them.

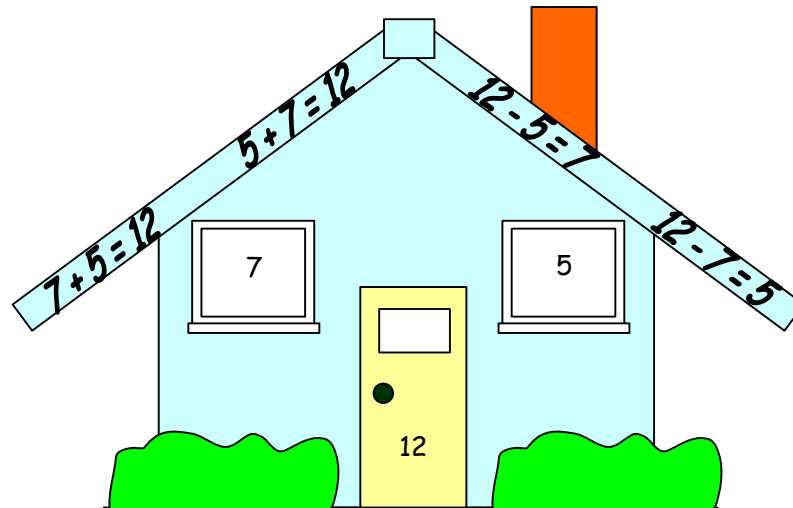
Keep notes below about the problems you have and how you solve them.



Name _____

4. Test your solution.

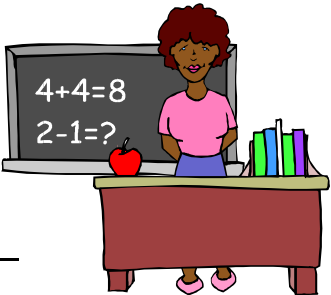
- Are your numbers odd on one side of the street and even on the other? YES NO
- Can you count $\begin{array}{ccc} 20 & 22 & 24 \\ \hline 21 & 23 & \end{array}$ or a similar sequence? YES NO



Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Math Fact Family Map*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student <ul style="list-style-type: none"> used complete sentences used plural and singular nouns. 					
Guided Portfolio: The student <ul style="list-style-type: none"> restated the problem brainstormed solutions created a solution tested the solution evaluated the solution. 					
Team Skills: The student <ul style="list-style-type: none"> used appropriate voice encouraged team members listened to team members was involved in all aspects of the project respected team members. 					

Tested Criteria		
The fact family was completed correctly.	Yes	No
The house numbers followed a pattern.	Yes	No
The map had a compass rose.	Yes	No
The map had a legend or map key.	Yes	No



Standards of Learning

English (2002)

Oral Language

- 1.1 The student will continue to demonstrate growth in the use of oral language.
 - a) Listen and respond to a variety of media, including books, audiotapes, videos, and other age-appropriate materials.
 - b) Tell and retell stories and events in logical order.
 - c) Participate in a variety of oral language activities, including choral speaking and reciting short poems, rhymes, songs, and stories with repeated patterns.
 - d) Express ideas orally in complete sentences.
- 1.2 The student will continue to expand and use listening and speaking vocabularies.
 - a) Increase oral descriptive vocabulary.
 - b) Begin to ask for clarification and explanation of words and ideas.
 - c) Follow simple two-step oral directions.
 - d) Give simple two-step oral directions.
 - e) Use singular and plural nouns.
- 1.3 The student will adapt or change oral language to fit the situation.
 - a) Initiate conversation with peers and adults.
 - b) Follow rules for conversation.
 - c) Use appropriate voice level in small-group settings.
 - d) Ask and respond to questions in small-group settings.

Writing

- 1.12 The student will write to communicate ideas.
 - a) Generate ideas.
 - b) Focus on one topic.
 - c) Use descriptive words when writing about people, places, things, and events.
 - d) Use complete sentences in final copies.
 - e) Begin each sentence with a capital letter and use ending punctuation in final copies.
 - f) Use correct spelling for frequently used words and phonetically regular words in final copies.
 - g) Share writing with others.
 - h) Use available technology.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 1.1 The student will conduct investigations in which
- a) differences in physical properties are observed using the senses;
 - b) simple tools are used to enhance observations
 - c) objects or events are classified and arranged according to attributes or properties;
 - d) observations and data are communicated orally and with simple graphs, pictures, written statements, and numbers;
 - e) length, mass, and volume are measured using standard and nonstandard units;
 - f) predictions are based on patterns of observation rather than random guesses;
 - g) simple experiments are conducted to answer questions;
 - h) inferences are made and conclusions are drawn about familiar objects and events.

Mathematics (2001)

Number and Number Sense

- 1.4 The student will recognize and write numerals 0 through 100.
- 1.5 The student will identify the ordinal positions first through tenth, using an ordered set of objects.

Computation and Estimation

- 1.8 The student will recall basic addition facts - i.e., sums to 10 or less - and the corresponding subtraction facts.

Geometry

- 1.15 The student will describe the proximity of objects in space (near, far, close by, below, above, up, down, beside, and next to).

Patterns, Functions, and Algebra

- 1.21 The student will recognize, describe, extend, and create a wide variety of patterns, including rhythmic, color, shape, and numerical. Patterns will include both growing and repeating patterns. Concrete materials and calculators will be used by students.

History and Social Science (2001)

Geography

- 1.4 The student will develop map skills by
- a) recognizing basic map symbols, including references to land, water, cities, and roads;
 - b) using cardinal directions on maps;
 - c) identifying the physical shape of the United States and Virginia on maps and globes;
 - d) locating Washington, D.C., the capital of the United States, and Richmond, the capital of Virginia, on a United States map.
- 1.5 The student will construct a simple map of a familiar area, using basic map symbols in the map legend.

Standards for Technological Literacy

Standard 2: Students will develop an understanding of the core concepts of technology.

Standard 3: Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

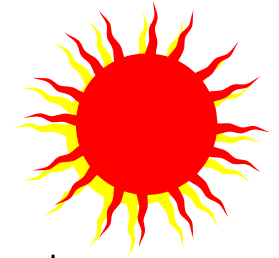
Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 12: Students will develop the abilities to use and maintain technological products and systems.

Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.

Solar Cooking



Background: The sun gives us energy. It provides the earth with heat and light. It helps grow food, makes weather, and keeps living things alive. We can use the sun's energy in many ways. When we burn wood in our fireplaces, we are releasing the sun's energy. The wood stores the energy from the sun and releases it as heat. We can use the sun's energy to cook food.

Design Challenge: Make a solar cooker that will heat a piece of hot dog. Be prepared to show your solar cooker to your class.

Criteria:

Your cooker must

- cook without being held
- be big enough to hold a 2" piece of hot dog
- hold a classroom thermometer.

Materials: You may select from the items below.

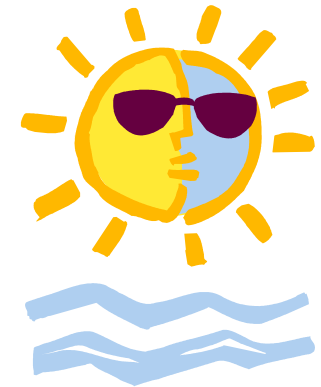
- | | | |
|----------------|----------------------------|-------------------|
| • tape | • toothpicks | • plastic cartons |
| • glue | • scissors | • foil |
| • cardboard | • thermometers (class set) | • craft sticks |
| • skewers | • milk cartons | • straws |
| • plastic lids | • hot dogs* | • string |

* Children should not eat the hot dog since it is not cooked in sanitary conditions.

Targeted Standard of Learning: Science 1.6
Supporting Standards of Learning: Science 1.1, 1.8
English 1.1, 1.2, 1.3, 1.12
Mathematics 1.18, 1.19

Targeted Standards for Technological Literacy: 5, 16
Supporting Standards for Technological Literacy: 2, 3, 6, 7, 8, 11

Solar Cooking



Targeted Standard of Learning: Science 1.6

- The student will investigate and understand the basic relationships between the sun and the Earth.

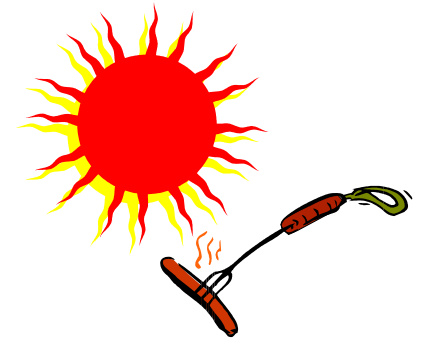
Targeted Standards for Technological Literacy: Standard 5, Standard 16

- Students will develop an understanding of the effects of technology on the environment.
- Students will develop an understanding of and be able to select and use energy and power technologies.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Dark objects absorb heat better. • Sunlight (heat) can be focused through reflective materials. • The sun is the earth's energy. • Nonstandard measuring skills 	<ul style="list-style-type: none"> • Check Design Brief for recommended materials. • Teacher may substitute materials. 	<ul style="list-style-type: none"> • Use of sharp tools to poke holes in plastic containers 	<ul style="list-style-type: none"> • Groups of three or four 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio • Rubric Assessment 	<ul style="list-style-type: none"> • Session 1: Introducing Design Brief (20 min.) • Session 2: Building (45 min.) • Session 3: Cooking the hotdog/using the thermometer (45 min.) • Session 4: Sharing and evaluating (40 min.)

Name _____

Solar Cooking



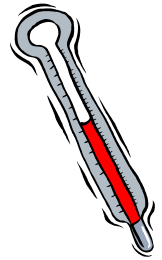
Group Members: _____

1. **What is the problem?** State the problem in *your own words*.

Targeted Standard of Learning: Science 1.6
Supporting Standards of Learning: Science 1.1, 1.8
English 1.1, 1.2, 1.3, 1.12
Mathematics 1.18, 1.19

Targeted Standards for Technological Literacy: 5, 16
Supporting Standards for Technological Literacy: 2, 3, 6, 7, 8, 11

Name _____



2. Brainstorm solutions.

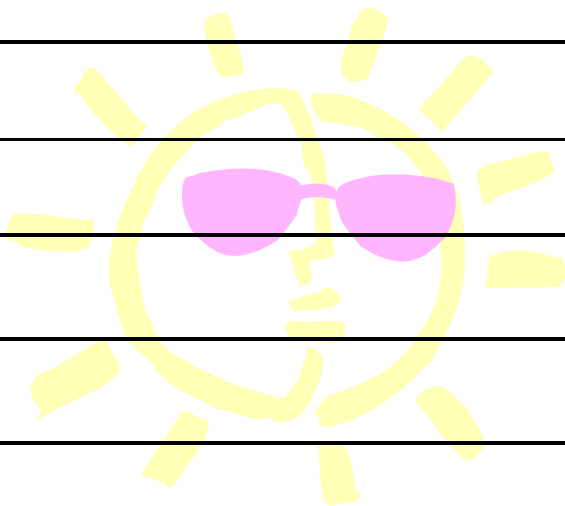
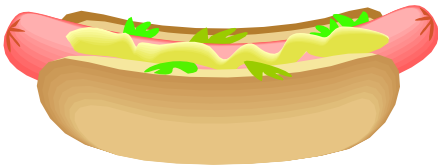
Draw or describe some possible solutions.



Name _____

3. Create the solution you think is best.

Keep notes below about the problems you have and how you solve them.





4. Test your solution.

- Does your solar cooker stand without holding it? YES NO
- Does your solar cooker make the hot dog warm to the touch? YES NO
- What temperature does the thermometer read in your solar cooker? _____



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Solar Cooking*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student <ul style="list-style-type: none"> used complete sentences used descriptive words. 					
Guided Portfolio: The student <ul style="list-style-type: none"> restated the problem brainstormed solutions created a solution tested the solution evaluated the solution. 					
Team Skills: The student <ul style="list-style-type: none"> used appropriate voice encouraged team members listened to team members was involved in all aspects of the project respected team members. 					

Tested Criteria		
The cooker stood on its own.	Yes	No
The cooker held a 2" hotdog.	Yes	No
The cooker held a small thermometer.	Yes	No



Standards of Learning

English (2002)

Oral Language

- 1.1 The student will continue to demonstrate growth in the use of oral language.
 - a) Listen and respond to a variety of media, including books, audiotapes, videos, and other age-appropriate materials.
 - b) Tell and retell stories and events in logical order.
 - c) Participate in a variety of oral language activities, including choral speaking and reciting short poems, rhymes, songs, and stories with repeated patterns.
 - d) Express ideas orally in complete sentences.
- 1.2 The student will continue to expand and use listening and speaking vocabularies.
 - a) Increase oral descriptive vocabulary.
 - b) Begin to ask for clarification and explanation of words and ideas.
 - c) Follow simple two-step oral directions.
 - d) Give simple two-step oral directions.
 - e) Use singular and plural nouns.
- 1.3 The student will adapt or change oral language to fit the situation.
 - a) Initiate conversation with peers and adults.
 - b) Follow rules for conversation.
 - c) Use appropriate voice level in small-group settings.
 - d) Ask and respond to questions in small-group settings.

Writing

- 1.12 The student will write to communicate ideas.
 - a) Generate ideas.
 - b) Focus on one topic.
 - c) Use descriptive words when writing about people, places, things, and events.
 - d) Use complete sentences in final copies.
 - e) Begin each sentence with a capital letter and use ending punctuation in final copies.
 - f) Use correct spelling for high-frequency sight words and phonetically regular words in final copies.
 - g) Share writing with others.
 - h) Use available technology.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 1.1 The student will conduct investigations in which
- a) differences in physical properties are observed using the senses;
 - b) simple tools are used to enhance observations;
 - c) objects or events are classified and arranged according to attributes or properties;
 - d) observations and data are communicated orally and with simple graphs, pictures, written statements, and numbers;
 - e) length, mass, and volume are measured using standard and nonstandard units;
 - f) predictions are based on patterns of observation rather than random guesses;
 - g) simple experiments are conducted to answer questions;
 - h) inferences are made and conclusions are drawn about familiar objects and events.

Interrelationships in Earth/Space Systems

- 1.6 The student will investigate and understand the basic relationships between the sun and the Earth. Key concepts include
- a) the sun is the source of heat and light that warms the land, air, and water; and
 - b) night and day are caused by the rotation of the Earth.

Resources

- 1.8 The student will investigate and understand that natural resources are limited. Key concepts include
- a) identification of natural resources (plants and animals, water, air, land, minerals, forests, and soil);
 - b) factors that affect air and water quality; and
 - c) recycling, reusing, and reducing consumption of natural resources.

Mathematics (2001)

Probability and Statistics

- 1.18 The student will investigate, identify, and describe various forms of data collection in his/her world (e.g., recording daily temperature, lunch count, attendance, and favorite ice cream), using tables, picture graphs, and object graphs.
- 1.19 The student will interpret information displayed in a picture or object graph, using the vocabulary *more, less, fewer, greater than, less than, and equal to*.

Standards for Technological Literacy

- Standard 2: Students will develop an understanding of the core concepts of technology.
- Standard 3: Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
- Standard 5: Students will develop an understanding of the effects of technology on the environment.
- Standard 6: Students will develop an understanding of the role of society in the development and use of technology.
- Standard 7: Students will develop an understanding of the influence of technology on history.
- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 11: Students will develop the abilities to apply the design process.
- Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.

Past and Present

Based on the book
The Little House by Virginia Burton



Background: Past and present comparisons are made through the eyes of a little house that once stood in the country but that was gradually engulfed by the city. Early childhood concepts studied are 1) past and present methods of transportation and building, and 2) past and present rural, suburban, and urban environments.

Design Challenge: Using the pattern for the little house, develop a changing background that shows at least three changes the little house experienced. You will be asked to share your work with the class.

Criteria:

- The background scenery must move while the house remains still, or the house can move while the background is still.
- You must use and construct a little house from a pattern.
- You must show three stages that the little house experienced.

Materials: You may select from the items below.

- | | | | | |
|-------------------|---------------|---------------|---------------|------------------|
| • tape | • paper | • tooth picks | • paper tubes | • styrofoam |
| • glue | • fabric | • straws | • brads | • wheels |
| • scissors | • wood sticks | • string | • gears | • house template |
| • crayons/markers | • paper clips | • yarn | • dowels | or own design |

Targeted Standard of Learning: History and Social Science 1.1
Supporting Standards of Learning: Science 1.2
English 1.1, 1.2, 1.3, 1.12

Targeted Standard for Technological Literacy: 7
Supporting Standards for Technological Literacy: 1, 4, 5, 6, 8, 11

The Little House

by
Virginia Burton

Synopsis: A little house is built in the country. As the years pass, the house sees many changes. The city, once a great distance away, encroaches upon the little house and soon engulfs it. A young woman walks by the little house dwarfed by huge skyscrapers and notices it. She remembers it from pictures as an old family home. In the end, the family home is moved from the city back into a country setting.

Teaching Moments: Have the children describe the differences they notice on each page. These may be the seasons, the far off lights of the city, the differences in modes of transportation, or the size and style of the buildings. Show pictures of neighborhoods and other areas. Parents may be a great source for some photos that show change in your area.

How old are your students' residences? What was there before? What do they predict will be there in the next few years? Answering these questions will help them bring the events of the story into their frame of reference.



Past and Present



Targeted Standard of Learning: History and Social Science 1.1

- The student will interpret information presented in picture time lines to show sequence of events and will distinguish between past and present.

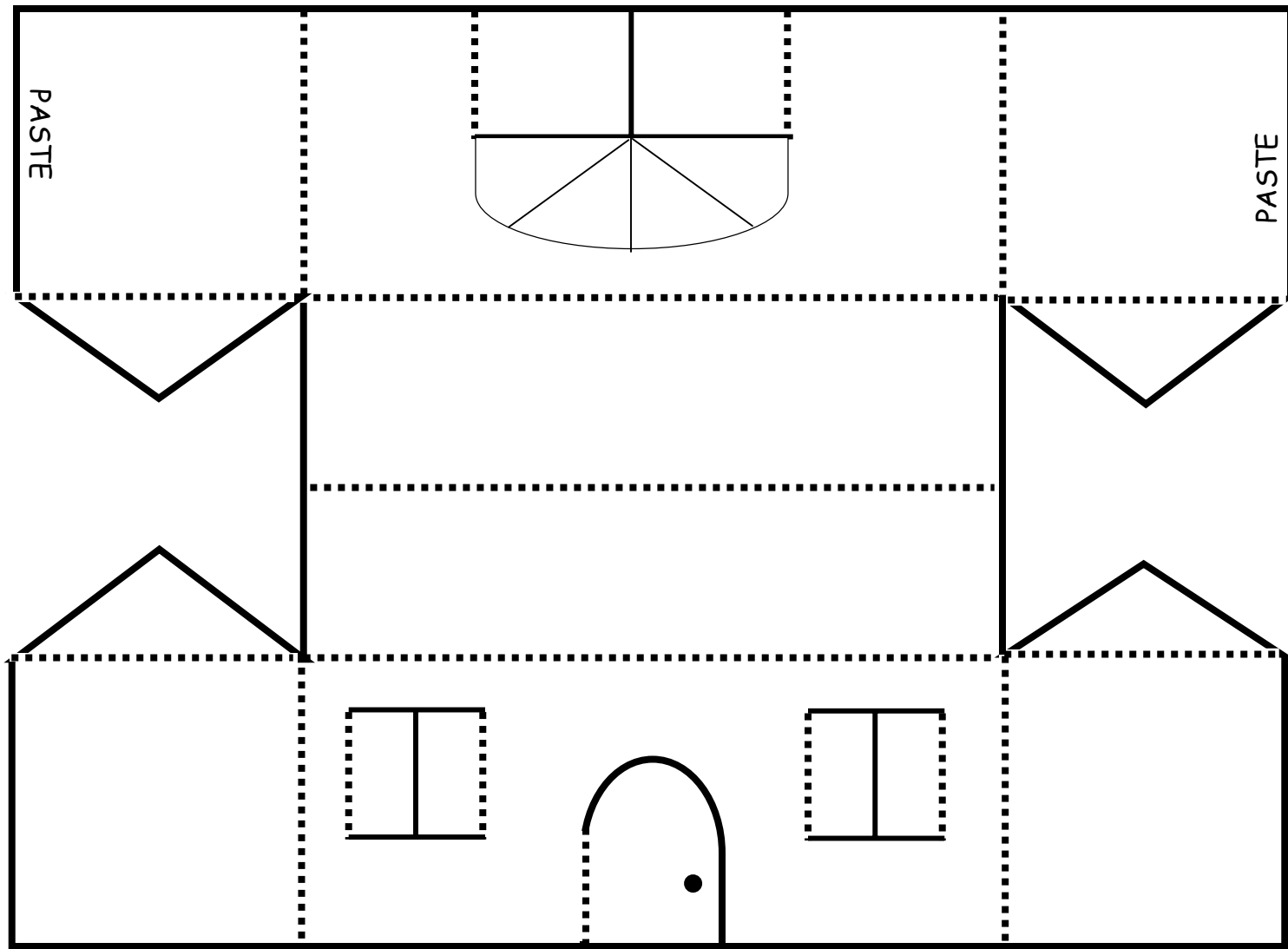
Targeted Standard for Technological Literacy: Standard 7

- Students will develop an understanding of the influence of technology on history.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Concept of change Time lines Cause and effect 	<ul style="list-style-type: none"> <u>The Little House</u> by Virginia Burton Check Design Brief for recommended materials. Teacher may substitute materials. 	<ul style="list-style-type: none"> Use of scissors 	<ul style="list-style-type: none"> Individual project Groups of three or four 	<ul style="list-style-type: none"> Design Brief Guided Portfolio (optional) Rubric Assessment House template or your own design 	<ul style="list-style-type: none"> Session 1: Reading story and introducing Design Brief (20 min.) Session 2: Building (40 min.) Session 3: Sharing and evaluating

Cut on solid lines. Fold on dotted lines.
Paste.

House Pattern



Guided Portfolio—1
Name _____

Past and Present



Group Members: _____

1. What is the problem? State the problem in *your own words*.

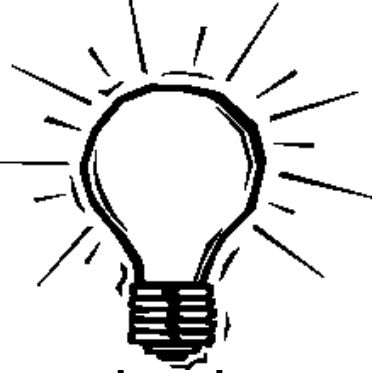
Targeted Standard of Learning: History and Social Science 1.1
Supporting Standards of Learning: Science 1.2
English 1.1, 1.2, 1.3, 1.12

Targeted Standard for Technological Literacy: 7
Supporting Standards for Technological Literacy: 1, 4, 5, 6, 8, 11



2. Brainstorm solutions.

Draw or describe some possible solutions.





Keep notes below about the problems you have and how you solve them.

A cartoon illustration of a small house with a pink roof, a yellow chimney, and green bushes. The house has a white door with a small window and two windows with orange frames. The illustration is centered on a background of horizontal lines.

Name _____

4. Test your solution.

- Does the background or the little house move? YES NO
- Are there three scenes showing three stages the little house experienced? YES NO



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Past and Present*

Name _____

Date _____

Student Evaluation	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
Oral Presentation: The student					
• used complete sentences					
• used descriptive words.					
Guided Portfolio: The student					
• restated the problem					
• brainstormed solutions					
• created a solution					
• tested the solution					
• evaluated the solution.					
Team Skills: The student					
• used appropriate voice					
• encouraged team members					
• listened to team members					
• was involved in all aspects of the project					
• respected team members.					

Tested Criteria		
The house experiences three changes.	Yes	No
The house was created from a pattern.	Yes	No
The scenery or the house moves.	Yes	No



Standards of Learning

English (2002)

Oral Language

- 1.1 The student will continue to demonstrate growth in the use of oral language.
 - a) Listen and respond to a variety of media, including books, audiotapes, videos, and other age-appropriate materials.
 - b) Tell and retell stories and events in logical order.
 - c) Participate in a variety of oral language activities, including choral speaking and reciting short poems, rhymes, songs, and stories with repeated patterns.
 - d) Express ideas orally in complete sentences.
- 1.2 The student will continue to expand and use listening and speaking vocabularies.
 - a) Increase oral descriptive vocabulary.
 - b) Begin to ask for clarification and explanation of words and ideas.
 - c) Follow simple two-step oral directions.
 - d) Give simple two-step oral directions.
 - e) Use singular and plural nouns.
- 1.3 The student will adapt or change oral language to fit the situation.
 - a) Initiate conversation with peers and adults.
 - b) Follow rules for conversation.
 - c) Use appropriate voice level in small-group settings.
 - d) Ask and respond to questions in small-group settings.

Writing

- 1.12 The student will write to communicate ideas.
 - a) Generate ideas.
 - b) Focus on one topic.
 - c) Use descriptive words when writing about people, places, things, and events.
 - d) Use complete sentences in final copies.
 - e) Begin each sentence with a capital letter and use ending punctuation in final copies.
 - f) Use correct spelling for high-frequency sight words and phonetically regular words in final copies.
 - g) Share writing with others.
 - h) Use available technology.

Science (2003)

Force, Motion, and Energy

- 1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include
- a) objects may have straight, circular, and back and forth motions;
 - b) objects may vibrate and produce sound;
 - c) pushes or pulls can change the movement of an object; and
 - d) the motion of objects may be observed in toys and in playground activities.

History and Social Science (2001)

History

- 1.1 The student will interpret information presented in picture time lines to show sequence of events and will distinguish between past and present.

Standards for Technological Literacy

- Standard 1: Students will develop an understanding of the characteristics and scope of technology.
- Standard 4: Students will develop an understanding of the cultural, social, economic, and political effects of technology.
- Standard 5: Students will develop an understanding of the effects of technology on the environment.
- Standard 6: Students will develop an understanding of the role of society in the development and use of technology.
- Standard 7: Students will develop an understanding of the influence of technology on history.
- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 11: Students will develop the abilities to apply the design process.

Dog Biscuit Delivery

Based on the book
Clifford's Family by Norman Bridwell



Background: We enjoyed reading the book Clifford's Family by Norman Bridwell. You have met Clifford's mom, dad, and the rest of his family. In the book, Clifford visits each of his family members. He wants to visit them again and take each of them one of his big, yummy dog biscuits.

Design Challenge: Design and construct a dog-biscuit container for Clifford to use when he takes dog biscuits to his family. You must choose one family member and design the container especially for that person.

Criteria:

Your container must

- be the correct size to hold the biscuit supplied by the teacher
- close tightly to protect the biscuit
- be decorated for one special family member
- be designed so that Clifford can carry it while he is walking.

Materials: You may select from the items below.

- | | | |
|--------------------------|---------------------------------|------------------------|
| • any recycled materials | • yarn or string | • glue |
| • tag board | • pipe cleaners | • general art supplies |
| • construction paper | • twelve inches of masking tape | • cardboard cylinders |
| • fabric scraps | • rulers | • scissors |

Targeted Standard of Learning: English 2.8
Supporting Standards of Learning: Mathematics 2.12
English 2.3, 2.11
Science 2.1

Targeted Standard for Technological Literacy: 18
Supporting Standard for Technological Literacy: 8, 10, 11

Dog Biscuit Delivery



Targeted Standard of Learning: English 2.8

- The student will read and demonstrate comprehension of fiction and nonfiction.

Targeted Standard for Technological Literacy: Standard 18

- Students will develop an understanding of and be able to select and use transportation technologies.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Understanding of targeted English Standard of Learning 2.8 Some understanding of the design process 	<ul style="list-style-type: none"> <u>Clifford's Family</u> by Norman Bridwell See Design Brief for recommended materials. Teacher may substitute materials. Teacher should give one large dog biscuit to each group of students 	<ul style="list-style-type: none"> Insure cleanliness of recycled materials. Caution students not to eat dog biscuits. 	<ul style="list-style-type: none"> Two to three students per group 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessment 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief & Portfolio Sessions 2 & 3: Building (30 min. each) Session 4: Sharing and evaluating (30 min.)



Dog Biscuit Delivery

Group Members: _____

1. What is the problem? State the problem in *your own words*.

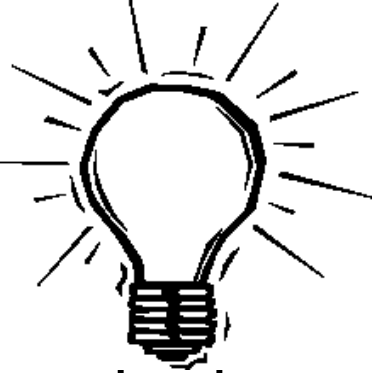
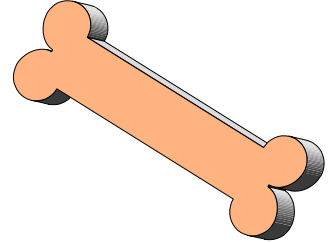
Targeted Standards of Learning: English 2.8
Supporting Standards of Learning: Mathematics 2.12
English 2.3, 2.11
Science 2.1

Targeted Standard for Technological Literacy: 18
Supporting Standard for Technological Literacy: 8, 10, 11

Name _____

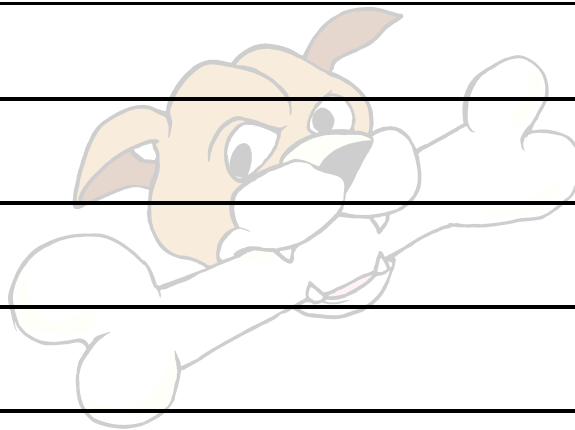
2. Brainstorm solutions.

Draw or describe some possible solutions.



Keep notes below about the problems you have and how you solve them.

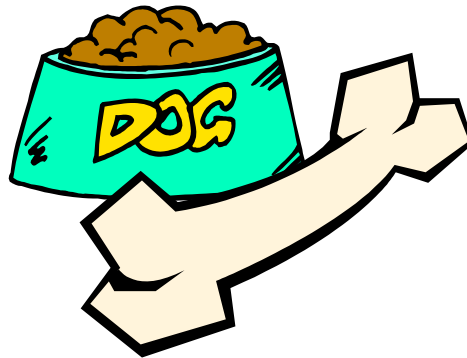
Keep notes below about the problems you have and how you solve them.



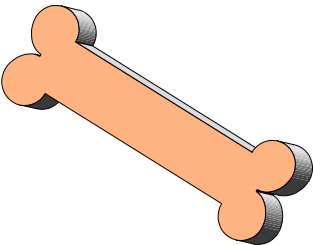
Name _____

4. Test your solution.

- Is your container the correct size to hold Clifford's dog biscuit? YES NO
- Does your container close tightly? YES NO
- Is your container decorated neatly for a special family member? YES NO
- Can Clifford easily carry your container while walking? YES NO



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Dog Biscuit Delivery*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the container to make sure <ul style="list-style-type: none"> it was the correct size it closed tightly to protect the biscuit it was decorated neatly for one family member it was designed so Clifford could carry it while walking. 					
The student completed the graph.					
The student evaluated how he/she could make it better next time.					



Rubric for *Dog Biscuit Delivery*

Name _____

Date _____

Oral Communication Rubric		no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
2.1 The student will demonstrate an understanding of oral language structure. a) Create oral stories to share with others. b) Create and participate in oral dramatic activities. c) Use correct verb tenses in oral communication. d) Use increasingly complex sentence structures in oral communication.						
2.2 The student will continue to expand listening and speaking vocabularies. a) Use words that reflect a growing range of interests and knowledge. b) Clarify and explain words and ideas orally. c) Follow oral directions with three or four steps. d) Give three- and four-step directions. e) Identify and use synonyms and antonyms in oral communication.						
2.3 The student will use oral communication skills. a) Use oral language for different purposes: to inform, to persuade, and to entertain. b) Share stories or information orally with an audience. c) Participates as a contributor and leader in a group. d) Summarize information shared orally by others.						



Standards of Learning

English (2002)

Oral Language

- 2.3 The student will use oral communication skills.
- a) Use oral language for different purposes: to inform, to persuade, and to entertain.
 - b) Share stories or information orally with an audience.
 - c) Participate as a contributor and leader in a group.
 - d) Summarize information shared orally by others.

Reading

- 2.8 The student will read and demonstrate comprehension of fiction and nonfiction.
- a) Make predictions about content.
 - b) Read to confirm predictions.
 - c) Relate previous experiences to the topic.
 - d) Ask and answer questions about what is read.
 - e) Locate information to answer questions.
 - f) Describe characters, setting, and important events in fiction and poetry.
 - g) Identify the problem, solution, and main idea.

Writing

- 2.11 The student will write stories, letters, and simple explanations.
- a) Generate ideas before writing.
 - b) Organize writing to include a beginning, middle, and end.
 - c) Revise writing for clarity.
 - d) Use available technology.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 2.1 The student will conduct investigations in which
- a) observation is differentiated from personal interpretation, and conclusions are drawn based on observations;
 - b) observations are repeated to ensure accuracy;
 - c) two or more attributes are used to classify items;
 - d) conditions that influence a change are defined;
 - e) length, volume, mass, and temperature measurements are made in metric (centimeters, meters, liters, degrees Celsius, grams, kilograms) and standard English units (inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds);
 - f) pictures and bar graphs are constructed using numbered axes;
 - g) unexpected or unusual quantitative data are recognized.
 - h) simple physical models are constructed;

Mathematics (2001)

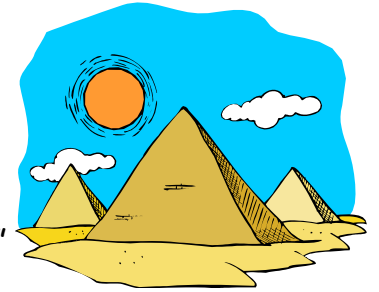
Measurement

- 2.12 The student will estimate and then use a ruler to make linear measurements to the nearest centimeter and inch, including measuring the distance around a polygon in order to determine perimeter.

Standards for Technological Literacy

- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- Standard 11: Students will develop the abilities to apply the design process.
- Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.

Ancient Construction



Background: We have been learning about the ancient Egyptians and their magnificent pyramids. You will use the information you have learned and the pictures you have seen to construct your own "step pyramid."

Design Challenge: Work with a group of two or three classmates. Design and build a model of a step pyramid, using the materials provided. Your pyramid must have four sides and be eight levels high with each level smaller than the one below it.

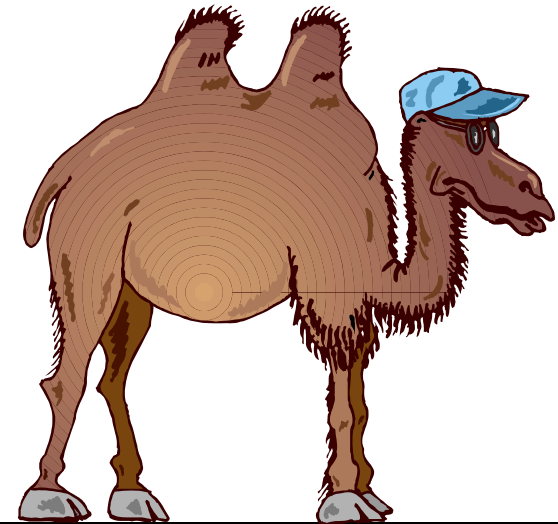
Criteria:

Your pyramid must

- fit on a cardboard base no larger than 18" by 18"
- be constructed of cubes or rectangular solids
- have four sides
- include steps on all four sides
- be eight levels high with each level smaller than the one below it.

Materials: You may select from the items below.

- sugar cubes
- glue (for sugar cubes)
- small blocks or dominoes
- cardboard base
- ruler



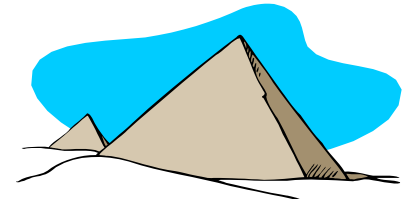
Targeted Standards of Learning: Mathematics 2.20
History and Social Science 2.1

Supporting Standards of Learning: Mathematics 2.12, 2.22
English 2.3, 2.8, 2.9, 2.11
Science 2.1

Targeted Standard for Technological Literacy: 7

Supporting Standard for Technological Literacy: 8

Ancient Construction



Targeted Standards of Learning:

- **Mathematics 2.20**
The student will identify, describe, and sort three-dimensional (solid) concrete figures, including a cube, rectangular solid (prism), sphere, cylinder, and cone according to the number and shape of the solid's faces, edges, and corners.
- **History and Social Science 2.1**
The student will explain how the contributions of ancient China and Egypt have influenced the present world in terms of architecture, inventions, the calendar, and written language.

Targeted Standard for Technological Literacy: Standard 7

- Students will develop an understanding of the influence of technology on history.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Exposure to target Mathematics Standard of Learning 2.20 and History and Social Science Standard of Learning 2.1 	<ul style="list-style-type: none"> • See Design Brief for recommended materials. • Teacher may substitute materials. 	<ul style="list-style-type: none"> • Caution students not to eat sugar cubes. 	<ul style="list-style-type: none"> • Two to three students per group • Students may need to build pyramid in two sessions in order for the glue to dry. 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio • Rubric Assessments • KWL 	<ul style="list-style-type: none"> • Session 1: Introducing Design Brief & Portfolio. Examining and discussing building materials. (40 min.) • Session 2: Building (40 min.) • Session 3: Sharing and evaluating (30 min.)

Name _____

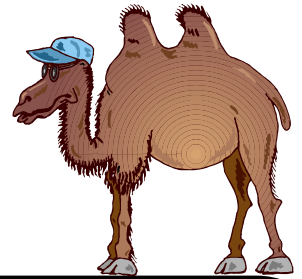
A stylized illustration of the Great Pyramids of Giza. Three pyramids of varying sizes are shown in a desert landscape. The largest pyramid is in the center, with two smaller ones on either side. The sky is a solid blue, and a large, bright orange sun with radiating lines is in the upper left. A single white cloud is on the right. The ground is a simple yellowish-brown.

Targeted Standard for Technological Literacy: 7
Supporting Standard for Technological Literacy: 8

Name _____

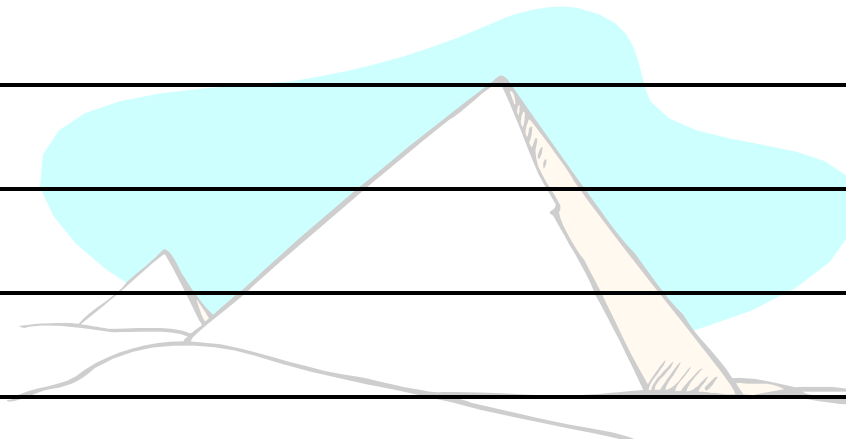
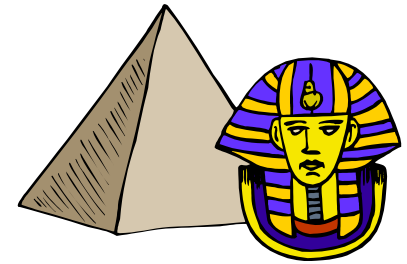
2. Brainstorm solutions.

Draw or describe some possible solutions.



Keep notes below about the problems you have and how you solve them.

Keep notes below about the problems you have and how you solve them.



Name _____

4. Test your solution.

- Does your pyramid fit on the 18" by 18" base?
- Is it constructed of cubes or rectangular solids?
- Does your pyramid have four sides?
- Does it have steps on each side?
- Is your pyramid eight levels high with each level smaller than the one below it?

YES

NO

YES

NO

YES

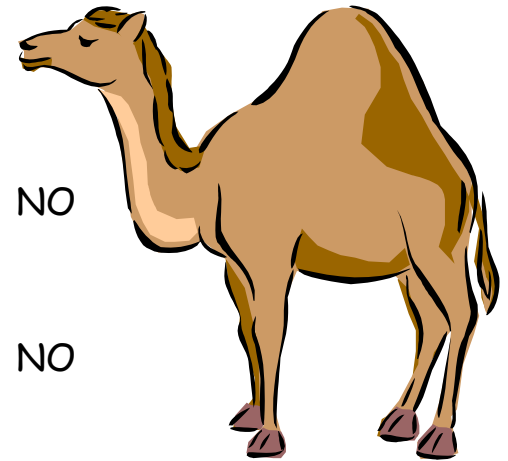
NO

YES

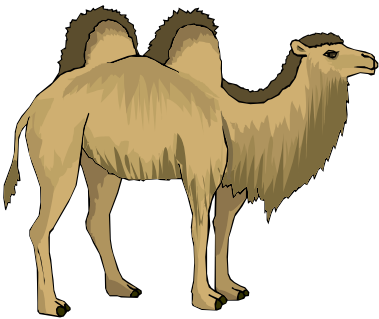
NO

YES

NO



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

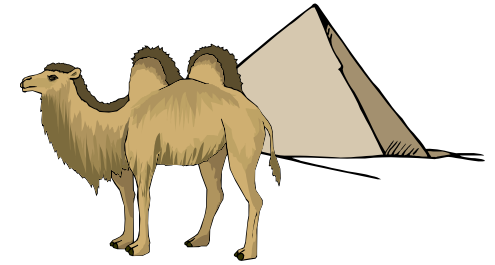
Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____



KWL: Ancient Pyramids

What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p>Sample Questions</p> <p>What materials were used to build the pyramids?</p> <p>How tall were pyramids?</p> <p>How much did the stones weigh?</p> <ul style="list-style-type: none"> • How did they move the stones? <p>Note: The teacher should make sure that all required information is listed in question form on the "W" (what we want to learn) section of the KWL. Use the <i>Virginia SOL Teacher Research Guide</i> to check what knowledge, skills, and processes are considered essential for the targeted Standards of Learning.</p>	

Targeted Standard of Learning: Mathematics 2.20
History and Social Science 2.1

Supporting Standards of Learning: Mathematics 2.12, 2.22
English 2.3, 2.8, 2.9, 2.11
Science 2.1

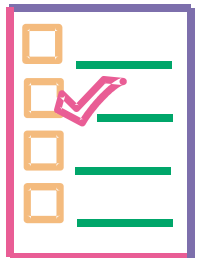
Targeted Standard for Technological Literacy: 7
Supporting Standard for Technological Literacy: 8

Rubric for *Ancient Construction*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the pyramid to make sure <ul style="list-style-type: none"> it fit on a base no larger than 18" by 18" it was constructed of cubes or rectangular solids it had four sides it had eight levels each level was smaller than the one below it. 					
The student evaluated how he/she could make it better next time.					



Rubric for *Ancient Construction*

Name _____

Date _____



Oral Communication Rubric		no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
2.1 The student will demonstrate an understanding of oral language structure. a) Create oral stories to share with others. b) Create and participate in oral dramatic activities. c) Use correct verb tenses in oral communication. d) Use increasingly complex sentence structures in oral communication.						
2.2 The student will continue to expand listening and speaking vocabularies. a) Use words that reflect a growing range of interests and knowledge. b) Clarify and explain words and ideas orally. c) Follow oral directions with three or four steps. d) Give three- and four-step directions. e) Identify and use synonyms and antonyms in oral communication.						
2.3 The student will use oral communication skills. a) Use oral language for different purposes: to inform, to persuade, and to entertain. b) Share stories or information orally with an audience. c) Participates as a contributor and leader in a group. d) Summarize information shared orally by others.						

Standards of Learning

English (2002)

Oral Language

- 2.3 The student will use oral communication skills.
- a) Use oral language for different purposes: to inform, to persuade, and to entertain.
 - b) Share stories or information orally with an audience.
 - c) Participate as a contributor and leader in a group.
 - d) Summarize information shared orally by others.

Reading

- 2.8 The student will read and demonstrate comprehension of fiction and nonfiction.
- a) Make predictions about content.
 - b) Read to confirm predictions.
 - c) Relate previous experiences to the topic.
 - d) Ask and answer questions about what is read.
 - e) Locate information to answer questions.
 - f) Describe characters, setting, and important events in fiction and poetry.
 - g) Identify the problem, solution, and main idea.
- 2.9 The student will demonstrate comprehension of information in reference materials.
- a) Use a table of contents.
 - b) Use pictures and charts.
 - c) Use dictionaries and indices.

Writing

- 2.11 The student will write stories, letters, and simple explanations.
- a) Generate ideas before writing.
 - b) Organize writing to include a beginning, middle, and end.
 - c) Revise writing for clarity.
 - d) Use available technology.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 2.1 The student will conduct investigations in which
- a) observation is differentiated from personal interpretation, and conclusions are drawn based on observations;
 - b) observations are repeated to ensure accuracy;
 - c) two or more attributes are used to classify items;
 - d) conditions that influence a change are defined;
 - e) length, volume, mass, and temperature measurements are made in metric (centimeters, meters, liters, degrees Celsius, grams, kilograms) and standard English units (inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds);
 - f) pictures and bar graphs are constructed using numbered axes;
 - g) unexpected or unusual quantitative data are recognized.
 - h) simple physical models are constructed;

Mathematics (2001)

Measurement

- 2.12 The student will estimate and then use a ruler to make linear measurements to the nearest centimeter and inch, including measuring the distance around a polygon in order to determine perimeter.

Geometry

- 2.20 The student will identify, describe, and sort three-dimensional (solid) concrete figures, including a cube, rectangular solid (prism), sphere, cylinder, and cone according to the number and shape of the solid's faces, edges, and corners.
- 2.22 The student will compare and contrast plane and solid geometric shapes (circle/sphere, square/cube, and rectangle/rectangular solid).

History and Social Science (2001)

History

- 2.1 The student will explain how the contributions of ancient China and Egypt have influenced the present world in terms of architecture, inventions, the calendar, and written language.

Standards for Technological Literacy

Standard 7: Students will develop an understanding of the influence of technology on history.

Standard 8: Students will develop an understanding of the attributes of design.

High Flying Balloons



Background: In our study of science we have been investigating the three stages of matter: solids, liquids and gases. You will use your knowledge of a gas to complete the following challenge.

Design Challenge: Work with a group of two to three classmates. Design and build a model of a hot air balloon, using the materials provided by the teacher. Once the balloons are completed, each group will test its balloon to see how high it will fly. A hairdryer will be used as the source of hot air.

Criteria:

Your balloon must

- use only the materials provided
- float off the ground by itself for 15 seconds.

Materials: You may select from the items below.

- lightweight, small-to-medium plastic trash bag
- paper cup
- string or thread (5 feet)



- hole punch
- scissors
- masking tape (about 6 inches)

Targeted Standard of Learning: Science 2.3
Supporting Standards of Learning: Science 2.1
English 2.3, 2.8, 2.9, 2.11
Mathematics 2.12, 2.23

Targeted Standard for Technological Literacy: 16
Supporting Standards for Technological Literacy: 9, 18

High Flying Balloons



Targeted Standard of Learning: Science 2.3

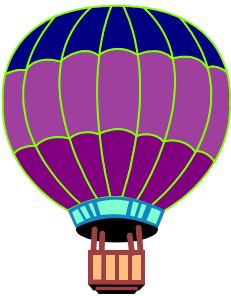
- The student will investigate and understand basic properties of solids, liquids, and gases.

Targeted Standard for Technological Literacy: Standard 16

- Students will develop an understanding of energy and power technologies.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to targeted Science Standard of Learning 2.3 Some understanding of the design process Some research on the basics of hot air balloons 	<ul style="list-style-type: none"> See Design Brief for recommended materials. Teacher may substitute materials. Teacher will supply a hair dryer and extension cord. Pictures of hot air balloons Experiment with the size and weight of the plastic and cup. 	<ul style="list-style-type: none"> Safe use of hair dryer and extension cord 	<ul style="list-style-type: none"> Two to three students per group You will want to fly your balloons in a cool place such as an air-conditioned room or outside when the temperature is cool. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessment KWL Sheet Graph Sheet 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (30 min.) Session 2: Building (45 min.) Session 3: Testing (45 min.) Session 4: Evaluating and graphing (40 min.)

Guided Portfolio—1
Name _____



High Flying Balloons

Group Members:

1. What is the problem? State the problem in *your own words*.

Targeted Standard of Learning: Science 2.3
Supporting Standards of Learning: Science 2.1
English 2.3, 2.8, 2.9, 2.11
Mathematics 2.12, 2.23

Targeted Standard for Technological Literacy: 16
Supporting Standards for Technological Literacy: 9, 18



2. Brainstorm solutions

Draw or describe some possible solutions.





Keep notes below about the problems you have and how you solve them.



Name _____

4. Test your solution.

- | | | |
|--|-----|----|
| • Did you use only the materials provided? | YES | NO |
| • Did your balloon float for 15 seconds? | YES | NO |



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

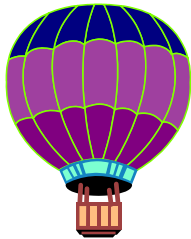
Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



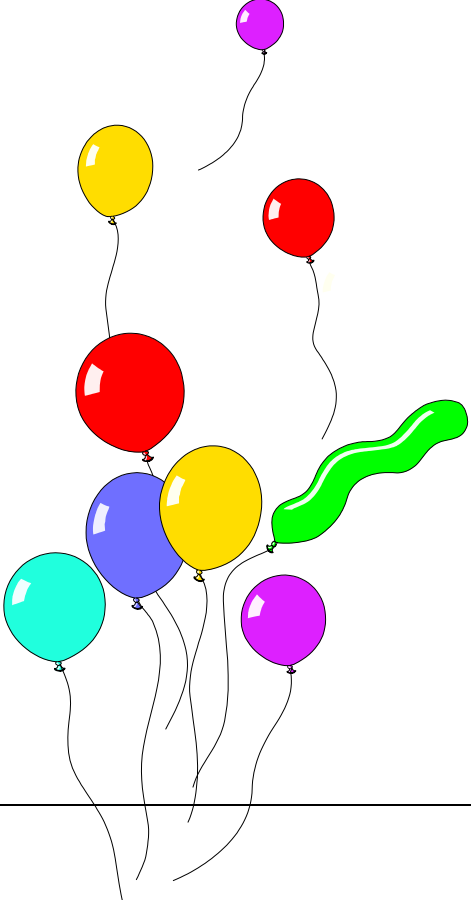
How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



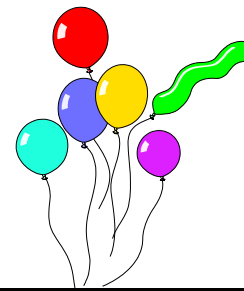
Hot Air Balloon Graph



Directions: Watch your balloon carefully as it rises in the air. Color the graph to show how high it goes on each flight.

Height Balloon Reaches	Ceiling			
	6 Feet			
	5 Feet			
	4 Feet			
	3 Feet			
	2 Feet			
	1 Foot			
		Flight One	Flight Two	Flight Three

Name _____



KWL: High Flying Balloons

What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p>Sample Questions</p> <p>What state of matter is air?</p> <p>Does air have mass and take up space?</p> <p>What happens to air when it is heated?</p> <p>Note: The teacher should make sure that all required information is listed in question form on the "W" (what we want to learn) section of the KWL. Use the <i>Virginia SOL Teacher Research Guide</i> to check what knowledge, skills, and processes are considered essential for the targeted Standard of Learning.</p>	

Targeted Standard of Learning: Science 2.3
Supporting Standards of Learning: Science 2.1
English 2.3, 2.8, 2.9, 2.11
Mathematics 2.12, 2.23

Targeted Standard for Technological Literacy: 16
Supporting Standards for Technological Literacy: 9, 18

Rubric for *High Flying Balloons*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the balloon to make sure <ul style="list-style-type: none"> it used only the materials provided it floated for 15 seconds 					
The student completed the graph.					
The student evaluated how he/she could make it better next time.					



Rubric for *High Flying Balloons*



Name _____

Date _____

Oral Communication Rubric		no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
2.1 The student will demonstrate an understanding of oral language structure. a) Create oral stories to share with others. b) Create and participate in oral dramatic activities. c) Use correct verb tenses in oral communication. d) Use increasingly complex sentence structures in oral communication.						
2.2 The student will continue to expand listening and speaking vocabularies. a) Use words that reflect a growing range of interests and knowledge. b) Clarify and explain words and ideas orally. c) Follow oral directions with three or four steps. d) Give three- and four-step directions. e) Identify and use synonyms and antonyms in oral communication.						
2.3 The student will use oral communication skills. a) Use oral language for different purposes: to inform, to persuade, and to entertain. b) Share stories or information orally with an audience. c) Participates as a contributor and leader in a group. d) Summarize information shared orally by others.						

Standards of Learning

English (2002)

Oral Language

- 2.3 The student will use oral communication skills.
- a) Use oral language for different purposes: to inform, to persuade, and to entertain.
 - b) Share stories or information orally with an audience.
 - c) Participate as a contributor and leader in a group.
 - d) Summarize information shared orally by others.

Reading

- 2.8 The student will read and demonstrate comprehension of fiction and nonfiction.
- a) Make predictions about content.
 - b) Read to confirm predictions.
 - c) Relate previous experiences to the topic.
 - d) Ask and answer questions about what is read.
 - e) Locate information to answer questions.
 - f) Describe characters, setting, and important events in fiction and poetry.
 - g) Identify the problem, solution, and main idea.
- 2.9 The student will demonstrate comprehension of information in reference materials.
- a) Use a table of contents.
 - b) Use pictures and charts.
 - c) Use dictionaries and indices.

Writing

- 2.11 The student will write stories, letters, and simple explanations.
- a) Generate ideas before writing.
 - b) Organize writing to include a beginning, middle, and end.
 - c) Revise writing for clarity.
 - d) Use available technology.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 2.1 The student will conduct investigations in which
- a) observation is differentiated from personal interpretation, and conclusions are drawn based on observations;
 - b) observations are repeated to ensure accuracy;
 - c) two or more attributes are used to classify items;
 - d) conditions that influence a change are defined;
 - e) length, volume, mass, and temperature measurements are made in metric (centimeters, meters, liters, degrees Celsius, grams, kilograms) and standard English units (inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds);
 - f) pictures and bar graphs are constructed using numbered axes;
 - g) unexpected or unusual quantitative data are recognized.
 - h) simple physical models are constructed;

Matter

- 2.3 The student will investigate and understand basic properties of solids, liquids, and gases. Key concepts include
- a) mass and volume; and
 - b) processes involved with changes in matter from one state to another (condensation, evaporation, melting, and freezing).

Mathematics (2001)

Measurement

- 2.12 The student will estimate and then use a ruler to make linear measurements to the nearest centimeter and inch, including measuring the distance around a polygon in order to determine perimeter.

Probability and Statistics

- 2.23 The student will read, construct, and interpret a simple picture and bar graph.

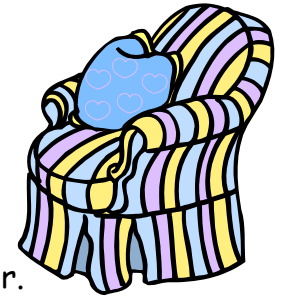
Standards for Technological Literacy

- Standard 9: Students will develop an understanding of engineering design.
- Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.
- Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.

A Chair for Mom

Based on the book

A Chair for My Mother by Vera B. Williams



Background: We read the book A Chair for My Mother by Vera B. Williams. A fire destroys everything the family owns. Rosa, the little girl in the story, wants to save money to buy her mother a big, comfortable chair.

Design Challenge: Design and build an attractive and comfortable chair for the little girl's mother. Include some feature on the chair that will make it special for her mom, such as a footrest or drink holder. Create a neat and colorful newspaper advertisement that shows a picture of the chair and its cost. Tell your classmates about your chair.

Criteria:

Your chair must

- have a special feature for your mom
- be comfortable and attractive
- be no larger than 12" by 12" in size
- have a reasonable price based on actual furniture prices found in advertisements
- have its special feature shown and described in the advertisement.

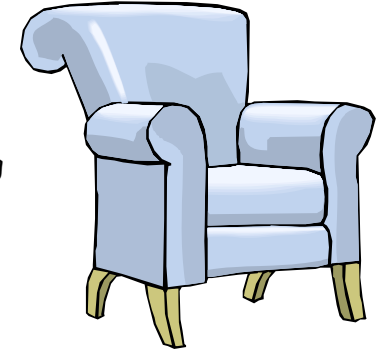
Materials: You may select from the items below.

- any recycled materials
- glue
- meat trays
- yarn or string
- tag/cardboard
- rulers
- masking tape (12 inches)
- craft sticks
- empty containers
- fabric/felt scraps
- general art supplies
- Lego, K'nex, or other commercial building sets

Targeted Standard of Learning: History and Social Science 2.9
Supporting Standards of Learning: Science 2.1, 2.8
English 2.3, 2.8, 2.9, 2.11
Mathematics 2.11

Targeted Standards for Technological Literacy: 6, 13
Supporting Standard for Technological Literacy: 8, 9, 11

A Chair for Mom



Targeted Standard of Learning: History and Social Science 2.9

- The student will explain that scarcity (limited resources) requires people to make choices about producing and consuming goods and services.

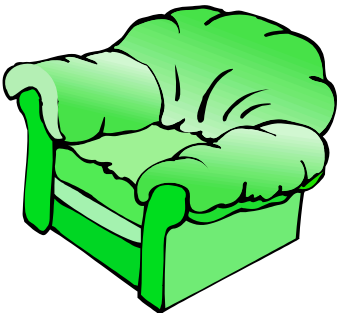
Targeted Standards for Technological Literacy: Standard 6

- Students will develop an understanding of the role of society in the development and use of technology.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to targeted History and Social Science Standard of Learning 2.9 Some understanding of the design process 	<ul style="list-style-type: none"> <u>A Chair for my Mother</u> by Vera B. Williams See Design Brief for recommended materials. Teacher may substitute materials. Collect newspaper/ magazine ads for chairs. 	<ul style="list-style-type: none"> Insure cleanliness of recycled materials. 	<ul style="list-style-type: none"> Works best in groups of two students, but no more than four students. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessment 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (30 min.) Sessions 2 & 3: Building (30 min. each) Session 3: Sharing and evaluating (40 min.)

Name _____

A Chair for Mom



Group Members: _____

1. What is the problem? State the problem in *your own words*.

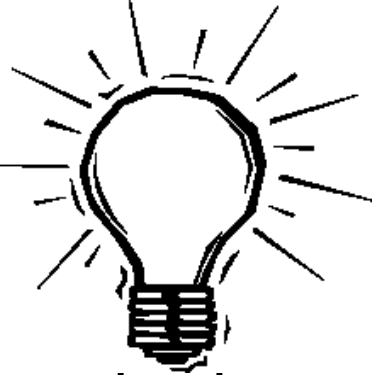
Targeted Standard of Learning: History and Social Science 2.9
Supporting Standards of Learning: Science 2.1, 2.8
English 2.3, 2.8, 2.9, 2.11
Mathematics 2.11

Targeted Standards for Technological Literacy: 6, 13
Supporting Standard for Technological Literacy: 8, 9, 11

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.





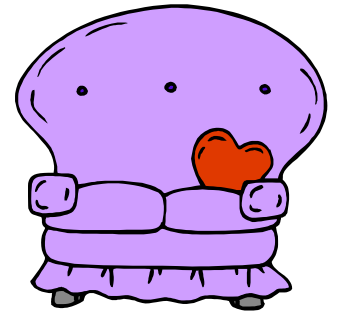
A cartoon illustration of a yellow and white striped armchair with a blue cushion, set against a background of horizontal lines. The chair is positioned in the lower center of the frame. The background consists of a series of horizontal lines, with a small yellow object visible in the top right corner.



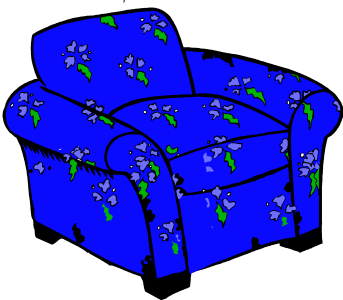
Name _____

4. Test your solution.

- | | | |
|--|-----|----|
| • Does your chair have a special feature? | YES | NO |
| • Is your chair comfortable and attractive? | YES | NO |
| • Is your chair no larger than 12" by 12"? | YES | NO |
| • Does your advertisement show and describe the special feature? | YES | NO |
| • Is your advertisement neat and colorful? | YES | NO |
| • Does your advertisement show the price of the chair? | YES | NO |



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.

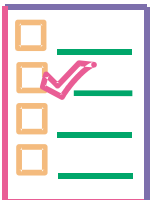


Rubric for *A Chair For Mom*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the chair to make sure <ul style="list-style-type: none"> it was no larger than 12" by 12" it had a special feature for mom it was comfortable and attractive. 					
The student created an advertisement that <ul style="list-style-type: none"> showed and described the special feature stated the cost of the chair was colorful and neat. 					
The student evaluated how he/she could make it better next time.					



Rubric for *A Chair For Mom*

Name _____

Date _____



Oral Communication Rubric		no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
2.1 The student will demonstrate an understanding of oral language structure. a) Create oral stories to share with others. b) Create and participate in oral dramatic activities. c) Use correct verb tenses in oral communication. d) Use increasingly complex sentence structures in oral communication.						
2.2 The student will continue to expand listening and speaking vocabularies. a) Use words that reflect a growing range of interests and knowledge. b) Clarify and explain words and ideas orally. c) Follow oral directions with three or four steps. d) Give three- and four-step directions. e) Identify and use synonyms and antonyms in oral communication.						
2.3 The student will use oral communication skills. a) Use oral language for different purposes: to inform, to persuade, and to entertain. b) Share stories or information orally with an audience. c) Participates as a contributor and leader in a group. d) Summarize information shared orally by others.						

Standards of Learning

English (2002)

Oral Language

- 2.3 The student will use oral communication skills.
- a) Use oral language for different purposes: to inform, to persuade, and to entertain.
 - b) Share stories or information orally with an audience.
 - c) Participate as a contributor and leader in a group.
 - d) Summarize information shared orally by others.

Reading

- 2.8 The student will read and demonstrate comprehension of fiction and nonfiction.
- a) Make predictions about content.
 - b) Read to confirm predictions.
 - c) Relate previous experiences to the topic.
 - d) Ask and answer questions about what is read.
 - e) Locate information to answer questions.
 - f) Describe characters, setting, and important events in fiction and poetry.
 - g) Explain the problem, solution, and main idea.
- 2.9 The student will demonstrate comprehension of information in reference materials.
- a) Use a table of contents.
 - b) Use pictures and charts.
 - c) Use dictionaries and indices.

Writing

- 2.11 The student will write stories, letters, and simple explanations.
- a) Generate ideas before writing.
 - b) Organize writing to include a beginning, middle, and end.
 - c) Revise writing for clarity.
 - d) Use available technology.

History and Social Science (2001)

Economics

- 2.9 The student will explain that scarcity (limited resources) requires people to make choices about producing and consuming goods and services.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 2.1 The student will conduct investigations in which
- a) observation is differentiated from personal interpretation, and conclusions are drawn based on observations;
 - b) observations are repeated to ensure accuracy;
 - c) two or more attributes are used to classify items;
 - d) conditions that influence a change are defined;
 - e) length, volume, mass, and temperature measurements are made in metric (centimeters, meters, liters, degrees Celsius, grams, kilograms) and standard English units (inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds);
 - f) pictures and bar graphs are constructed using numbered axes;
 - g) unexpected or unusual quantitative data are recognized.
 - h) simple physical models are constructed;

Resources

- 2.8 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. Key concepts include
- a) important plant products (fiber, cotton, oil, spices, lumber, rubber, medicines, and paper);
 - b) the availability of plant products affects the development of a geographic area; and
 - c) plants provide homes and food for many animals and prevent soil from washing away.

Mathematics (2001)

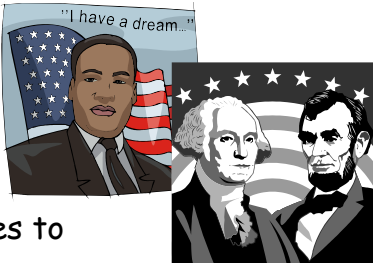
Measurement

- 2.11 The student will
- a) count and compare a collection of pennies, nickels, dimes, and quarters whose total value is \$2.00 or less; and
 - b) identify the correct usage of the cent symbol (¢), dollar symbol (\$), and decimal point (.).

Standards for Technological Literacy

- Standard 6: Students will develop an understanding of the role of society in the development and use of technology.
- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 11: Students will develop the abilities to apply the design process.
- Standard 13: Students will develop the abilities to assess the impact of products and systems.

Famous Historical Figures



Background: You have been assigned to read a biography or an autobiography of an important person in American history. Follow your teacher's directions about taking notes as you read. You will use your notes to help you complete the challenge below.

Design Challenge: Design and create a special card that will help you and your classmates remember important facts about your person. Your closed card should be no smaller than seven inches by nine inches. The shape and appearance of the card should reflect the individual about whom you read. The title and name of the author of the book should be on the front of your card. You must include a lever-operated moving part and a pop-up on the inside of your card. The person's name, dates of birth and death, and five pertinent facts about the person must be displayed on or in the card.

Criteria:

Your card must

- | | | |
|--|--|--|
| ■ be no smaller than 7" by 9" | ■ have the book's title and author's name on the front | ■ include the historic person's name and dates of birth and death |
| ■ have a shape and appearance that reflects the person about whom you read | ■ have a lever-operated moving part on the inside card | ■ have five pertinent facts about the historic person displayed on or in the card. |
| ■ reflect the person's time in history | ■ have a pop-up inside card | |

Materials: You may select from the items below.

- | | | | |
|----------------------|---------------|-------------------|--------------------------------|
| • card stock | • brads | • colored pencils | • paste |
| • construction paper | • paper clips | • crayons | • other classroom art supplies |
| • poster board | • markers | • scissors | |

Targeted Standard of Learning: English 3.6
Supporting Standards of Learning: English 3.2, 3.4
Mathematics 3.14
History and Social Science 3.3, 3.11

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 11

Famous Historical Figures



Targeted Standard of Learning: English 3.6

- The student will continue to read and demonstrate comprehension of nonfiction.

Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to targeted English Standard of Learning 3.6 Some understanding of the design process Exposure to simple machines (Science Standard of Learning 3.2) 	<ul style="list-style-type: none"> List names of historical figures: George Washington, Thomas Jefferson, Abraham Lincoln, Rosa Parks, Thurgood Marshall, Martin L. King, Jr., Christopher Columbus, Juan Ponce de Leon, Jacques Cartier, Christopher Newport, Susan B. Anthony, Helen Keller, Jackie Robinson, Benjamin Franklin, George Washington Carver, Pocahontas, Betsy Ross. Check Design Brief for recommended materials. Teachers may substitute materials. 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Each student makes own card. Each student keeps own Guided Portfolio. Students reading about same person may work in a small group as long as each child completes own card and Portfolio. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessment KWL 	<ul style="list-style-type: none"> Session 1: Explaining reading assignment and KWL. Introducing Design Brief. Session 2: Planning (45 min.) Session 3: Building (60 min.) Session 4: Sharing and evaluating (45 min.)



Famous Historical Figures

1. What is the problem? State the problem in *your own words*.

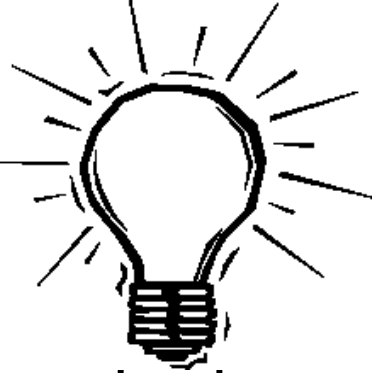
Targeted Standard of Learning: English 3.6
Supporting Standards of Learning: English 3.2, 3.4
Mathematics 3.14
History and Social Science 3.3, 3.11

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 11

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.





3. Create the solution you think is best.
Keep notes below about the problems you have and how you solve them.

Name _____



4. Test your solution.

- | | | |
|--|-----|----|
| • Is your card at least 7" by 9"? | YES | NO |
| • Is the book's title and author's name on the front of your card? | YES | NO |
| • Does the card's shape and appearance reflect the individual about whom you read? | YES | NO |
| • Does your card have a lever-operated moving part inside? | YES | NO |
| • Does your card have a pop-up feature inside? | YES | NO |
| • Does your project include the historical person's name and dates of birth and death? | YES | NO |
| • Does your project include five pertinent facts about the person? | YES | NO |
| • Is all of your work colorful and neatly done? | YES | NO |

Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

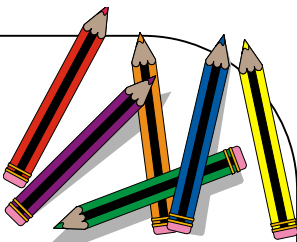
Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____



KWL: Famous Historical Figures

What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p>Note: The teacher should make sure that all required information is listed in question form on the "W" (what we want to learn) section of the KWL. Use your <i>Virginia SOL Teacher Resource Guide</i> to check what knowledge, skills, and processes are considered essential for supporting the History and Social Science Standards of Learning 3.3 and 3.11. When necessary refer to the Resource Guide for previous grade levels. This activity is designed to support the civics and history objectives that require students to know about contributions of specific individuals to our history.</p>	

Targeted Standard of Learning: English 3.6
 Supporting Standards of Learning: English 3.2, 3.4
 Mathematics 3.14
 History and Social Science 3.3, 3.11

Targeted Standard for Technological Literacy: 9
 Supporting Standards for Technological Literacy: 8, 11

Rubric for *Famous Historical Figures*

Name _____

Date _____



Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the card to make sure <ul style="list-style-type: none"> it was the correct size its shape and appearance reflected the individual studied it had the book's title and the author's name on the front it had a lever operating a moving part it had a pop-up to see if the work was colorful and neatly done. 					
The student tested the inside to make sure <ul style="list-style-type: none"> it included the historical person's name and dates of birth and death it contained five pertinent facts about the person. 					
The student evaluated how he/she could make it better next time.					

Rubric for *Famous Historical Figures*

Name _____

Date _____

Oral Communication Rubric	no evidence	limited understanding	some understanding with room for improvement	good understanding with room for improvement	substantial understanding
	0	1	2	3	4
3.1 The student will use effective communication skills in group activities. a) Listen attentively by making eye contact, facing the speaker, asking questions, and summarizing what is said. b) Ask and respond to questions from teachers and other group members. c) Explain what has been learned.					
3.2 The student will present brief oral reports. a) Speak clearly. b) Use appropriate volume and pitch. c) Speak at an understandable rate. d) Organize ideas sequentially or around major points of information. e) Use grammatically correct language and specific vocabulary to communicate ideas.					



Standards of Learning

English (2002)

Oral Language

- 3.2 The student will present brief oral reports.
- a) Speak clearly.
 - b) Use appropriate volume and pitch.
 - c) Speak at an understandable rate.
 - d) Organize ideas sequentially or around major points of information.
 - e) Use grammatically correct language and specific vocabulary to communicate ideas.

Reading

- 3.4 The student will use strategies to read a variety of fiction and nonfiction materials.
- a) Preview and use text formats.
 - b) Set a purpose for reading.
 - c) Apply meaning clues, language structure, and phonetic strategies.
 - d) Use context to clarify meaning of unfamiliar words.
 - e) Read fiction and nonfiction fluently and accurately.
 - f) Reread and self-correct when necessary.
- 3.6 The student will continue to read and demonstrate comprehension of nonfiction.
- a) Identify the author's purpose.
 - b) Make connections between previous experiences and reading selections.
 - c) Ask and answer questions about what is read.
 - d) Draw conclusions.
 - e) Organize information and events logically.
 - f) Summarize major points found in nonfiction materials.
 - g) Identify the characteristics of biographies and autobiographies.
 - h) Compare and contrast the lives of two persons as described in biographies and/or autobiographies

Mathematics (2001)

Measurement

- 3.14 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure
- a) length-inches, feet, yards, centimeters, and meters;
 - b) liquid volume-cups, pints, quarts, gallons, and liters; and
 - c) weight/mass-ounces, pounds, grams, and kilograms.

History and Social Science (2001)

History

- 3.3 The student will study the exploration of the Americas by
- a) describing the accomplishments of Christopher Columbus, Juan Ponce de León, Jacques Cartier, and Christopher Newport;
 - b) identifying reasons for exploring, the information gained, and the results from the travels.

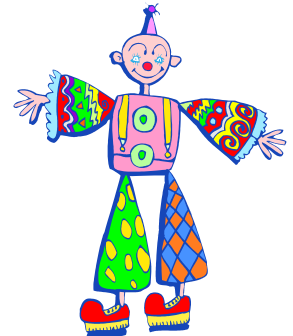
Civics

- 3.11 The student will explain the importance of the basic principles that form the foundation of a republican form of government by
- a) describing the individual rights to life, liberty, and the pursuit of happiness; and equality under the law;
 - b) identifying the contributions of George Washington, Thomas Jefferson, Abraham Lincoln, Rosa Parks, Thurgood Marshall, and Martin Luther King, Jr.;
 - c) recognizing that Veterans Day and Memorial Day honor people who have served to protect the country's freedoms.

Standards for Technological Literacy

- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 11: Students will develop the abilities to apply the design process.

Geometric Creatures



Background: We have been learning about geometric shapes, such as squares, triangles, rectangles, circles, cubes, rectangular solids, spheres, pyramids, cones, and cylinders.

Design Challenge: Design and build an imaginary geometric creature using both plane and solid geometric shapes. Your geometric creature must stand by itself and have at least two moving parts.

Criteria:

Your creature must

- have at least five plane shapes
- have at least three solid shapes
- have two moving parts (use levers, pneumatics, and/or pulleys)
- stand by itself
- be attractive.

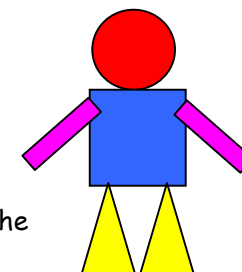
Materials: You may select from the items below.

- rulers
- construction paper
- brads
- poster board
- craft sticks
- cardboard cylinders
- glue
- straws
- tag board
- plastic tubing
- empty containers
- 12 inches of string or yarn
- spools
- paint
- general art supplies
- syringes
- 12 inches of tape
- balloons

Targeted Standard of Learning: Mathematics 3.18
Supporting Standards of Learning: Mathematics 3.14
Science 3.1, 3.2
English 3.1, 3.2, 3.4

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Geometric Creatures



Targeted Standard of Learning: Mathematics 3.18

- The student will analyze two-dimensional (plane) and three-dimensional (solid) geometric figures (circle, square, rectangle, triangle, cube, rectangular solid [prism], square pyramid, sphere, cone, and cylinder) and identify relevant properties, including the number of corners, square corners, edges, and the number and shape of faces, using concrete models.

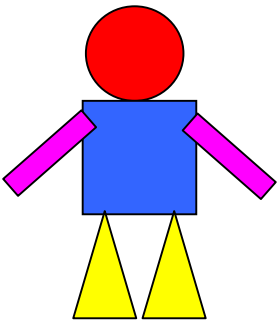
Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to targeted Mathematics Standard of Learning 3.18 including constructing solid shapes Some understanding of the design process Exposure to pneumatic systems if materials are available Exposure to simple machines (Science Standard of Learning 3.2) 	<ul style="list-style-type: none"> Check Design Brief for recommended materials. Teacher may substitute materials. In advance, collect empty food packaging, paper towel and toilet paper rolls, and tissue boxes. 	<ul style="list-style-type: none"> Use only syringes provided by the teacher. 	<ul style="list-style-type: none"> Small groups Each student keeps own Guided Portfolio. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessments 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (45 min.) Session 2: Building (60 min.) Session 3: Building (45 min.) Session 4: Sharing and evaluating (45 min.)

Guided Portfolio—1
Name _____

Geometric Creatures



Group Members: _____

1. What is the problem? State the problem in *your own words*.

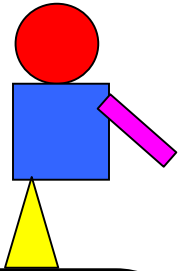
Targeted Standard of Learning: Mathematics 3.18
Supporting Standards of Learning: Mathematics 3.14
 Science 3.1, 3.2
 English 3.1, 3.2, 3.4

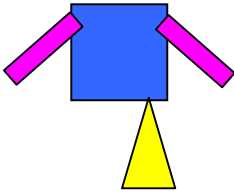
Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.



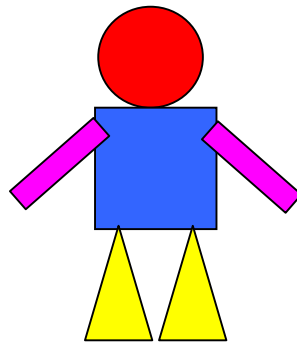


3. Create the solution you think is best.
Keep notes below about the problems you have and how you solve them.

Name _____

4. Test your solution.

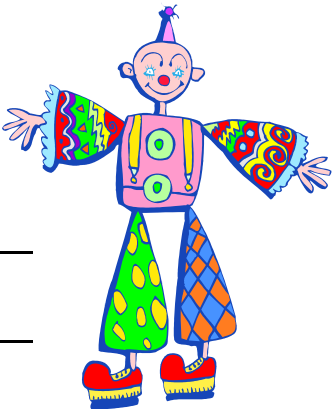
- | | | |
|--|-----|----|
| • Does your creature have at least five plane shapes? | YES | NO |
| • Does your creature have at least three solid shapes? | YES | NO |
| • Does your creature have two parts that use levers, pneumatics, or pulleys to move? | YES | NO |
| • Does your creature stand by itself for at least five minutes? | YES | NO |
| • Does your creature remain standing when its parts are moving? | YES | NO |
| • Is all of your work colorful and neatly done? | YES | NO |



Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

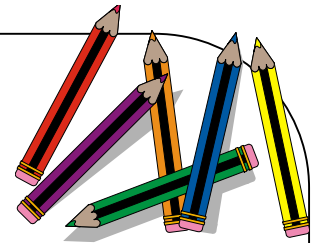
Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



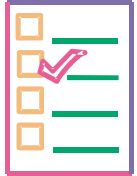
How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Geometric Creatures*

Name _____

Date _____



Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the creature <ul style="list-style-type: none"> for at least five different plane shapes for at least three solid shapes for two parts that use levers, pneumatics, or pulleys to move to see if it could stand alone for at least five minutes to see if it remained standing when its parts were moving to see if the work was colorful and neatly done. 					
The student evaluated how he/she could make it better next time.					
The student spoke clearly and confidently during oral presentation.					

Rubric for *Geometric Creatures*

Name _____

Date _____

Oral Communication Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
3.1 The student will use effective communication skills in group activities. a) Listen attentively by making eye contact, facing the speaker, asking questions, and summarizing what is said. b) Ask and respond to questions from teachers and other group members. c) Explain what has been learned.					
3.2 The student will present brief oral reports. a) Speak clearly. b) Use appropriate volume and pitch. c) Speak at an understandable rate. d) Organize ideas sequentially or around major points of information. e) Use grammatically correct language and specific vocabulary to communicate ideas.					



Standards of Learning

English (2002)

Oral Language

- 3.1 The student will use effective communication skills in group activities.
 - a) Listen attentively by making eye contact, facing the speaker, asking questions, and summarizing what is said.
 - b) Ask and respond to questions from teachers and other group members.
 - c) Explain what has been learned.
- 3.2 The student will present brief oral reports.
 - a) Speak clearly.
 - b) Use appropriate volume and pitch.
 - c) Speak at an understandable rate.
 - d) Organize ideas sequentially or around major points of information.
 - e) Use clear grammatically correct language and specific vocabulary to communicate ideas.

Reading

- 3.4 The student will use strategies to read a variety of fiction and nonfiction materials.
 - a) Preview and use text formats.
 - b) Set a purpose for reading.
 - c) Apply meaning clues, language structure, and phonetic strategies.
 - d) Use context to clarify meaning of unfamiliar words.
 - e) Read fiction and nonfiction fluently and accurately.
 - f) Reread and self-correct when necessary.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 3.1 The student will plan and conduct investigations in which
 - a) predictions and observations are made;
 - b) objects with similar characteristics are classified into at least two sets and two subsets;
 - c) questions are developed to formulate hypotheses;
 - d) volume is measured to the nearest milliliter and liter;
 - e) length is measured to the nearest centimeter;
 - f) mass is measured to the nearest gram;
 - g) data are gathered, charted, and graphed (line plot, picture graph, and bar graph);
 - h) temperature is measured to the nearest degree Celsius;

Science (2003) continued

Scientific Investigation, Reasoning, and Logic

- i) time is measured to the nearest minute;
- j) inferences are made and conclusions are drawn; and
- k) natural events are sequenced chronologically.

Force, Motion, and Energy

- 3.2 The student will investigate and understand simple machines and their uses. Key concepts include
- a) types of simple machines (lever, screw, pulley, wheel and axle, inclined plane, and wedge);
 - b) how simple machines function;
 - c) compound machines (scissors, wheelbarrow, and bicycle); and
 - c) examples of simple and compound machines found in the school, home, and work environment.

Mathematics (2001)

Measurement

- 3.14 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure
- a) length-inches, feet, yards, centimeters, and meters;
 - b) liquid volume-cups, pints, quarts, gallons, and liters; and
 - c) weight/mass-ounces, pounds, grams, and kilograms.

Geometry

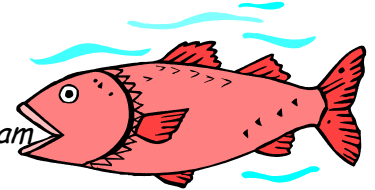
- 3.18 The student will analyze two-dimensional (plane) and three-dimensional (solid) geometric figures (circle, square, rectangle, triangle, cube, rectangular solid [prism], square pyramid, sphere, cone, and cylinder) and identify relevant properties, including the number of corners, square corners, edges, and the number and shape of faces, using concrete models.

Standards for Technological Literacy

- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- Standard 11: Students will develop the abilities to apply the design process.

Exploring Animal Environments

forest - desert - grassland - rainforest - marshland - swamp - pond - river - ocean - stream



Background: In our studies of science, we have been investigating various water and dry-land environments to help us understand how these environments can support a diversity of plants and animals while sharing limited resources. You will use your research to complete the challenge below.

Design Challenge: Work with classmates who have researched the same environment. Choose a mammal, reptile, bird, amphibian, fish, or insect that lives there. Design and build a model of the animal. Make sure that we can identify the animal by looking at it and that a part of it can move without your hands touching the animal. You must provide a scenic background for your animal that represents the environment in which it lives.

Criteria:

Your animal must

- be identifiable by looking at it
- be the appropriate size for the background
- have at least one part that can move repeatedly without you touching the animal's body.

Your background must

- be no smaller than 12" by 24" and no larger than 24" by 36" when flat
- stand by itself behind your animal.
- All of your work must be colorful and neat.

Materials: You may select from the items below.

- | | | | | |
|----------------------|-------------------|-------------------|------------------------|------------------|
| • cardboard | • cardboard tubes | • paper fasteners | • general art supplies | • syringes |
| • construction paper | • paper clips | • 1 yard of tape | • newspaper | • plastic tubing |
| • poster board | • styrofoam | • egg cartons | • 1 yard of string | |
| • balloons | • straws | • craft sticks | • magnets | |

Targeted Standard of Learning: Science 3.6
Supporting Standards of Learning: Science 3.1, 3.2, 3.4, 3.10
Mathematics 3.14
English 3.1, 3.2, 3.3, 3.4, 3.6, 3.7

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Exploring Animal Environments



Targeted Standard of Learning: Science 3.6

- The student will investigate and understand that environments support a diversity of plants and animals that share limited resources.

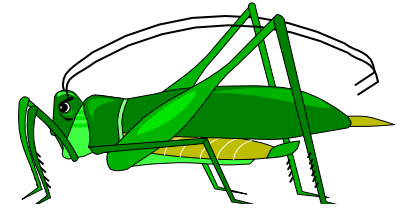
Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Some understanding of targeted Science Standard of Learning 3.6 Completed KWL research Some understanding of the design process Exposure to simple mechanisms Exposure to pneumatic systems 	<ul style="list-style-type: none"> Check Design Brief for recommended materials. Teacher may substitute materials. 	<ul style="list-style-type: none"> Use only those syringes provided by the teacher. Supervise cutting of styrofoam. 	<ul style="list-style-type: none"> Small group Each student keeps own Guided Portfolio. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessments KWL 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (60 min.) Sessions 2 & 3: Building (45 min. each) Session 4: Sharing and evaluating (60 min.)

Name _____

Exploring Animal Environments



Group Members: _____

1. What is the problem? State the problem in *your own words*.

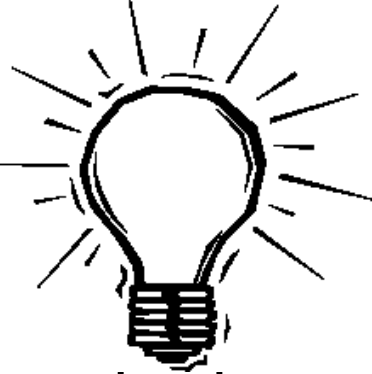
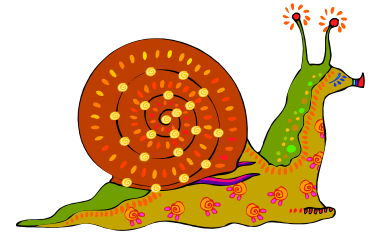
Targeted Standard of Learning: Science 3.6
Supporting Standards of Learning: Science 3.1, 3.2, 3.4, 3.10
Mathematics 3.14
English 3.1, 3.2, 3.3, 3.4, 3.6, 3.7

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.



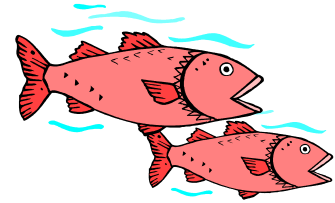
Name _____

3. Create the solution you think is best.

Keep notes below about the problems you have and how you solve them.

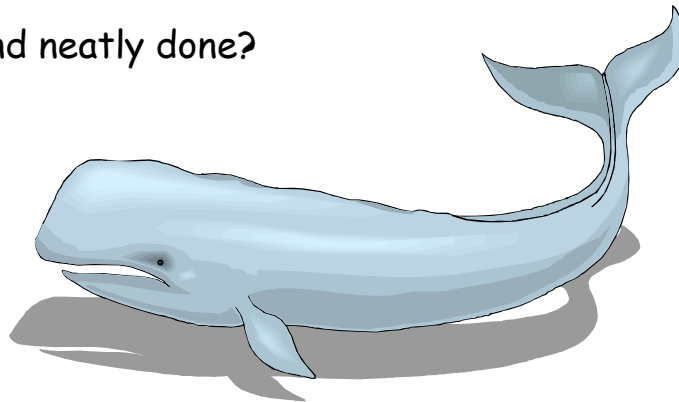


Name _____



4. Test your solution.

- | | | |
|--|-----|----|
| • Is your animal the appropriate size for the background? | YES | NO |
| • Is your animal identifiable by looking at it? | YES | NO |
| • Does your animal have at least one part that can move repeatedly without your hands touching the animal? | YES | NO |
| • Is the background no smaller than 12" by 24" and no larger than 24" by 36" when flat? | YES | NO |
| • Can the background stand by itself behind your animal? | YES | NO |
| • Is all of your work colorful and neatly done? | YES | NO |



Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

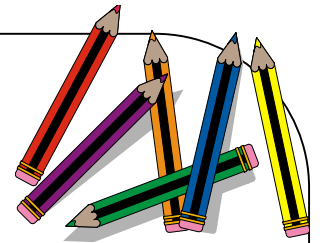
Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____

KWL: Exploring Animal Environments



What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p>Sample Questions</p> <p>Where can this environment be found?</p> <p>What kind of animals live there?</p> <p>What kind of plants grow there?</p> <p>What is the climate?</p> <p>Note: The teacher should make sure that all required information is listed in question form on the "W" (what we want to learn) section of the KWL. Use your <i>Virginia SOL Teacher Resource Guide</i> to check what knowledge, skills, and processes are considered essential for the targeted Standard of Learning.</p>	

Targeted Standard of Learning: Science 3.6
Supporting Standards of Learning: Science 3.1, 3.2, 3.4, 3.10
Mathematics 3.14
English 3.1, 3.2, 3.3, 3.4, 3.6, 3.7

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11,

Rubric for *Exploring Animal Environments*

Name _____

Date _____



Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the animal to make sure <ul style="list-style-type: none"> it was identifiable it was an appropriate size for the background it had at least one part that can move without touching the animal's body its moveable part could move eight times without breaking it was colorful and neat. 					
The student created a background that <ul style="list-style-type: none"> was the appropriate size could stand by itself was colorful and neat. 					
The student evaluated how he/she could make it better next time.					

Rubric for *Exploring Animal Environments*

Name _____

Date _____

Oral Communication Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
3.1 The student will use effective communication skills in group activities.					
a) Listen attentively by making eye contact, facing the speaker, asking questions, and summarizing what is said.					
b) Ask and respond to questions from teachers and other group members.					
c) Explain what has been learned.					
3.2 The student will present brief oral reports.					
a) Speak clearly.					
b) Use appropriate volume and pitch.					
c) Speak at an understandable rate.					
d) Organize ideas sequentially or around major points of information.					
e) Use grammatically correct language and specific vocabulary to communicate ideas.					



Standards of Learning

English (2002)

Oral Language

- 3.1 The student will use effective communication skills in group activities.
 - a) Listen attentively by making eye contact, facing the speaker, asking questions, and summarizing what is said.
 - b) Ask and respond to questions from teachers and other group members.
 - c) Explain what has been learned.
- 3.2 The student will present brief oral reports.
 - a) Speak clearly.
 - b) Use appropriate volume and pitch.
 - c) Speak at an understandable rate.
 - d) Organize ideas sequentially or around major points of information.
 - e) Use clear grammatically correct language and specific vocabulary to communicate ideas.

Reading

- 3.3 The student will apply word-analysis skills when reading.
 - a) Use knowledge of all vowel patterns.
 - b) Use knowledge of homophones.
 - c) Decode regular multisyllabic words.
- 3.4 The student will use strategies to read a variety of fiction and nonfiction materials.
 - a) Preview and use text formats.
 - b) Set a purpose for reading.
 - c) Apply meaning clues, language structure, and phonetic strategies.
 - d) Use context to clarify meaning of unfamiliar words.
 - e) Read fiction and nonfiction fluently and accurately.
 - f) Reread and self-correct when necessary.
- 3.6 The student will continue to read and demonstrate comprehension of nonfiction.
 - a) Identify the author's purpose.
 - b) Make connections between previous experiences and reading selections.
 - c) Ask and answer questions about what is read.
 - d) Draw conclusions.
 - e) Organize information and events logically.
 - f) Summarize major points found in nonfiction materials
 - g) Identify the characteristics of biographies and autobiographies.
 - h) Compare and contrast the lives of two persons as described in biographies and/or autobiographies.

English (2002) continued

Reading

- 3.7 The student will demonstrate comprehension of information from a variety of print resources.
- a) Use dictionary, glossary, thesaurus, encyclopedia and other reference books, including online reference materials.
 - b) Use available technology.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 3.1 The student will plan and conduct investigations in which
- a) predictions and observations are made;
 - b) objects with similar characteristics are classified into at least two sets and two subsets;
 - c) questions are developed to formulate hypotheses;
 - d) volume is measured to the nearest milliliter and liter;
 - e) length is measured to the nearest centimeter;
 - f) mass is measured to the nearest gram;
 - g) data are gathered, charted, and graphed (line plot, picture graph, and bar graph);
 - h) temperature is measured to the nearest degree Celsius;
 - i) time is measured to the nearest minute;
 - j) inferences are made and conclusions are drawn; and
 - k) natural events are sequenced chronologically.

Force, Motion, and Energy

- 3.2 The student will investigate and understand simple machines and their uses. Key concepts include
- a) types of simple machines (lever, screw, pulley, wheel and axle, inclined plane, and wedge);
 - b) how simple machines function;
 - c) compound machines (scissors, wheelbarrow, and bicycle); and
 - c) examples of simple and compound machines found in the school, home, and work environment.

Life Processes

- 3.4 The student will investigate and understand that behavioral and physical adaptations allow animals to respond to life needs. Key concepts include
- a) methods of gathering and storing food, finding shelter, defending themselves, and rearing young; and
 - b) hibernation, migration, camouflage, mimicry, instinct, and learned behavior.

Living Systems

- 3.6 The student will investigate and understand that environments support a diversity of plants and animals that share limited resources. Key concepts include
- a) water-related environments (pond, marshland, swamp, stream, river, and ocean environments);
 - b) dry-land environments (desert, grassland, rainforest, and forest environments); and
 - c) population and community.

Science (2003) continued

Resources

- 3.10 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include
- a) the interdependency of plants and animals;
 - b) human effects on the quality of air, water, and habitat;
 - c) the effects of fire, flood, disease, and erosion on organisms; and
 - d) conservation and resource renewal.

Mathematics (2001)

Measurement

- 3.14 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure
- a) length-inches, feet, yards, centimeters, and meters;
 - b) liquid volume-cups, pints, quarts, gallons, and liters; and
 - c) weight/mass-ounces, pounds, grams, and kilograms.

Standards for Technological Literacy

- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- Standard 11: Students will develop the abilities to apply the design process.

Shipping Across the Centuries



Background: Ships have played a major part in history. You have studied how they were used in the ancient cultures of Greece and Rome. You will now use your knowledge of the ancient cultures of Greece and Rome to complete this challenge. Follow your teacher's directions for researching more information about the ships and boats used by the people living in ancient Greece and ancient Rome.

Design Challenge: Design and build a model of a ship from either ancient Greece or ancient Rome. The design of your ship should include the details that made it unique to its own culture and have at least one simple machine. Your ship should be no smaller than 6 inches long and no larger than 14 inches from bow to stern. It should be able to float in water for at least 5 minutes.

Criteria:

Your ship should

- have a hull longer than 6 inches but shorter than 14 inches
- be designed and decorated with details from the culture it represents
- include at least one simple machine
- float for a period of 5 minutes or longer.

Materials: You may select from the items below.

- | | | | | |
|---------------------------|-------------------|-----------------------------------|-------------------|-----------------|
| • card stock/poster board | • brads | • spools | • paste/glue | • straws |
| • construction paper | • paper clips | • markers/crayons/colored pencils | • fabric scraps | • aluminum foil |
| • tissue paper | • styrofoam trays | • scissors | • craft sticks | |
| • cardboard milk cartons | • pipe cleaners | • string | • plastic bottles | |

Targeted Standard of Learning: History and Social Science 3.1, 3.8
Supporting Standards of Learning: History and Social Science 3.4
Science 3.1, 3.2
English 3.1, 3.2, 3.4, 3.6, 3.7

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 1, 6, 7, 8, 10, 11, 18

Shipping Across the Centuries



Targeted Standard of Learning: History and Social Science 3.1 and 3.8

- The student will explain how the contributions of ancient Greece and Rome have influenced the present world in terms of architecture, government (direct and representative democracy), and sports.
- The student will recognize the concepts of specialization (being an expert in one job, product, or service) and interdependence (depending on others) in the production of goods and services (in ancient Greece, Rome, the West African empire of Mali, and in the present).

Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Exposure to targeted Standard of Learning 3.8 and supporting History Standard of Learning 3.1 • Research information and pictures of ancient ships • Exposure to supporting Science Standard of Learning 3.2 • Discussion of properties of materials • Some understanding of the design process 	<ul style="list-style-type: none"> • Check Design Brief for recommended materials. Teacher may substitute materials. • Provide a plastic or metal tub for testing the completed ships. • For Web searches, use key words "Ancient Roman Technology," "Ancient Ship Building," "Ancient Greek Technology," and "Ancient Ships." • Oral communication skills are essential for this project. The assignment should be completed in class to emphasize the supporting Standards of Learning objectives. 	<ul style="list-style-type: none"> • Supervise cutting of milk cartons, plastic bottles, and styrofoam. 	<ul style="list-style-type: none"> • Small groups of no more than four students • Each child keeps own Guided Portfolio. • Teacher should approve plans before students begin building. 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio • Rubric Assessments 	<ul style="list-style-type: none"> • Session 1: Introducing Design Brief and Portfolio. (60 min.) • Session 2: Building (60 min.) • Session 3: Sharing and evaluating (45 min.)

Name _____

Shipping Across the Centuries



Group Members: _____

1. **What is the problem?** State the problem in *your own words*.

Targeted Standard of Learning: History and Social Science 3.1, 3.8
Supporting Standards of Learning: History and Social Science 3.4
Science 3.1, 3.2
English 3.1, 3.2, 3.4, 3.6, 3.7

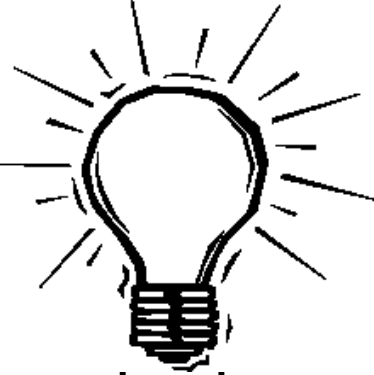
Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 1, 6, 7, 8, 10, 11, 18

Name _____



2. Brainstorm solutions.

Draw or describe some possible solutions.



Name _____

3. Create the solution you think is best.

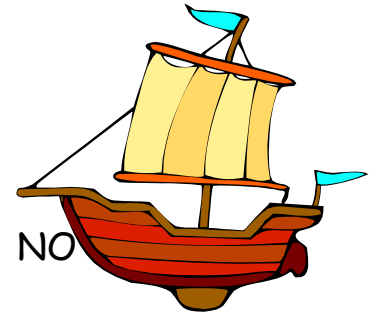
Keep notes below about the problems you have and how you solve them.



Name _____

4. Test your solution.

- Is the hull of your ship longer than 6 inches but shorter than 14 inches? YES NO
- Is your ship designed with details from the culture it represents? YES NO
- Is your ship decorated with details from the culture it represents? YES NO
- Does your ship have at least one simple machine? YES NO
- Can your ship float for a period of 5 minutes or longer? YES NO



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

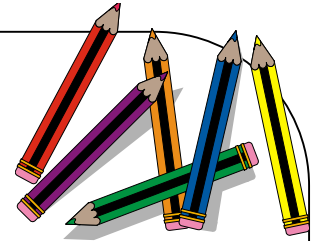
Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Shipping Across the Centuries*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and solutions.					
The student tested the ship to make sure <ul style="list-style-type: none"> the hull was longer than 6 inches but shorter than 14 inches the ship had at least one simple machine it floated for at least 5 minutes. 					
The student designed and decorated the ship with details from its culture.					
The student evaluated how he/she might have made it better next time.					



Rubric for *Shipping Across the Centuries*

Name _____

Date _____

Oral Communication Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
3.1 The student will use effective communication skills in group activities.					
a) Listen attentively by making eye contact, facing the speaker, asking questions, and summarizing what is said.					
b) Ask and respond to questions from teachers and other group members.					
c) Explain what has been learned.					
3.2 The student will present brief oral reports.					
a) Speak clearly.					
b) Use appropriate volume and pitch.					
c) Speak at an understandable rate.					
d) Organize ideas sequentially or around major points of information.					
e) Use grammatically correct language and specific vocabulary to communicate ideas.					



Standards of Learning

English (2002)

Oral Language

- 3.1 The student will use effective communication skills in group activities.
 - a) Listen attentively by making eye contact, facing the speaker, asking questions, and summarizing what is said.
 - b) Ask and respond to questions from teachers and other group members.
 - c) Explain what has been learned.
- 3.2 The student will present brief oral reports.
 - a) Speak clearly.
 - b) Use appropriate volume and pitch.
 - c) Speak at an understandable rate.
 - d) Organize ideas sequentially or around major points of information.
 - e) Use grammatically correct language and specific vocabulary to communicate ideas.

Reading

- 3.4 The student will use strategies to read a variety of fiction and nonfiction materials.
 - a) Preview and use text formats.
 - b) Set a purpose for reading.
 - c) Apply meaning clues, language structure, and phonetic strategies.
 - d) Use context to clarify meaning of unfamiliar words.
 - e) Read fiction and nonfiction fluently and accurately.
 - f) Reread and self-correct when necessary.
- 3.6 The student will continue to read and demonstrate comprehension of nonfiction.
 - a) Identify the author's purpose.
 - b) Make connections between previous experiences and reading selections.
 - c) Ask and answer questions about what is read.
 - d) Draw conclusions.
 - e) Organize information and events logically.
 - f) Summarize major points found in nonfiction materials
 - g) Identify the characteristics of biographies and autobiographies.
 - h) Compare and contrast the lives of two persons as described in biographies and/or autobiographies.
- 3.7 The student will demonstrate comprehension of information from a variety of print resources.
 - a) Use dictionary, glossary, thesaurus, encyclopedia and other reference books, including online reference materials.
 - b) Use available technology.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 3.1 The student will plan and conduct investigations in which
- a) predictions and observations are made;
 - b) objects with similar characteristics are classified into at least two sets and two subsets;
 - c) questions are developed to formulate hypotheses;
 - d) volume is measured to the nearest milliliter and liter;
 - e) length is measured to the nearest centimeter;
 - f) mass is measured to the nearest gram;
 - g) data are gathered, charted, and graphed (line plot, picture graph, and bar graph);
 - h) temperature is measured to the nearest degree Celsius;
 - i) time is measured to the nearest minute;
 - j) inferences are made and conclusions are drawn; and
 - k) natural events are sequenced chronologically.

Force, Motion, and Energy

- 3.2 The student will investigate and understand simple machines and their uses. Key concepts include
- a) types of simple machines (lever, screw, pulley, wheel and axle, inclined plane, and wedge);
 - b) how simple machines function;
 - c) compound machines (scissors, wheelbarrow, and bicycle); and
 - c) examples of simple and compound machines found in the school, home, and work environment.

History and Social Science (2001)

History

- 3.1 The student will explain how the contributions of ancient Greece and Rome have influenced the present world in terms of architecture, government (direct and representative democracy), and sports.

Geography

- 3.4 The student will develop map skills by
- a) locating Greece, Rome, and West Africa;
 - b) describing the physical and human characteristics of Greece, Rome, and West Africa;
 - c) explaining how the people of Greece, Rome, and West Africa adapted to and/or changed their environment to meet their needs.

Economics

- 3.8 The student will recognize the concepts of specialization (being an expert in one job, product, or service) and interdependence (depending on others) in the production of goods and services (in ancient Greece, Rome, the West African empire of Mali, and in the present).

Standards for Technological Literacy

- Standard 1: Students will develop an understanding of the characteristics and scope of technology.
- Standard 6: Students will develop an understanding of the role of society in the development and use of technology.
- Standard 7: Students will develop an understanding of the influence of technology on history.
- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- Standard 11: Students will develop the abilities to apply the design process.
- Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.

The Virginia Company of London Wants You!

Background: The Virginia Company of London has hired you to recruit new settlers to Jamestown. You will need to have a good working knowledge about why Jamestown was settled and what life was like in the Virginia colony. Use a KWL format to guide your research.

Design Challenge: Design and produce a brochure that will entice people to make the trip to Jamestown. Use your knowledge of English Standard of Learning 4.5 as you design your brochure. Use headings to emphasize different sections, use a variety of print styles, sizes, and colors, and use appropriate illustrations.



Criteria:

Your brochure should

- have two folds
- contain appropriate illustrations
- contain special print styles, captions, and headings
- be organized to stress the positive reasons for making the trip
- have correct grammar, capitalization, punctuation, and spelling
- have a perimeter of no more than 50 inches and no less than 40 inches.

Materials: You may select from the items below.

- card stock
- tag board
- construction paper
- scrap paper
- general art supplies (markers, colored pencils, paste, and scissors)

Targeted Standard of Learning: English 4.5
Supporting Standards of Learning: English 4.1, 4.2, 4.6, 4.7, 4.8
Mathematics 4.11, 4.13
History and Social Science VS.3, VS.4

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 11

The Virginia Company of London Wants You!



Targeted Standard of Learning: English 4.5

- The student will read and demonstrate comprehension of nonfiction.

Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to targeted English Standard of Learning 4.5 Knowledge of the Virginia Company of London and life Jamestown Some understanding of the design process 	<ul style="list-style-type: none"> Check Design Brief for recommended materials. Teacher may substitute materials. Students may complete the project with the assistance of a computer software program. Materials list could be changed to the name of the required software program. The rest of the activity packet would remain the same. <p>Special Hints</p> <ul style="list-style-type: none"> Use in conjunction with history Standards of Learning. Teachers could provide own history content rubric and use as part of a history assessment. Students may want to see the "Test Your Solution" (p.6) and "Design Brief Rubric" (p.10) before they begin their work. 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Small groups, pairs, or individuals Each student keeps own Guided Portfolio. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessments 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (45 min.) Session 2: Building (60 min.) Session 3: Sharing and evaluating (45 min.)

Name _____

The Virginia Company of London Wants You!



Group Members: _____

1. What is the problem? State the problem in *your own words*.

Targeted Standard of Learning: English 4.5
Supporting Standards of Learning: History and Social Science VS.3, VS.4
Mathematics 4.11, 4.13
English 4.1, 4.2, 4.6, 4.7, 4.8

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 11

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.



Name _____

3. Create the solution you think is best.

Keep notes below about the problems you have and how you solve them.



Name _____



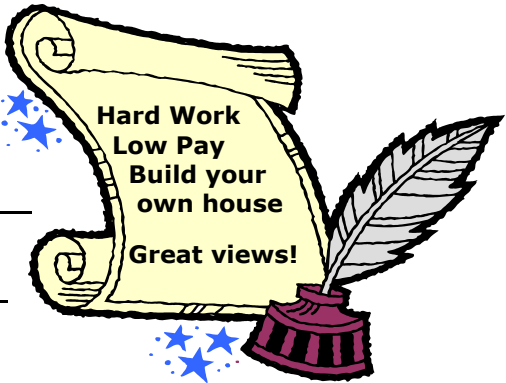
4. Test your solution.

- | | | |
|---|-----|----|
| • Does your brochure have two folds? | YES | NO |
| • Does your brochure contain headings that emphasize various sections? | YES | NO |
| • Does your brochure contain various print styles, such as different sizes, boldness, and colors? | YES | NO |
| • Does your brochure meet the size requirements? | YES | NO |
| • Does your brochure have appropriate illustrations? | YES | NO |
| • Does your brochure have captions under illustrations? | YES | NO |
| • Does your brochure stress the positive reasons for making the trip? | YES | NO |
| • Does your brochure contain correct grammar, capitalization, punctuation, and spelling? | YES | NO |

Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

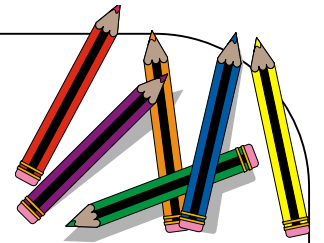
Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____

KWL: The Virginia Company of London Wants You!



What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p>Note: The teacher should make sure that all required information is listed in question form on the "W" (what we want to learn) section of the KWL. Use your <i>Virginia SOL Teacher Resource Guide</i> to check what knowledge, skills, and processes are considered essential for supporting the History and Social Science Standards of Learning VS3 and VS4. When necessary refer to the Resource Guide for previous grade levels.</p>	

Targeted Standard of Learning: English 4.5
Supporting Standards of Learning: History and Social Science VS.3, VS.4
Mathematics 4.11, 4.13
English 4.1, 4.2, 4.6, 4.7, 4.8

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 11

Rubric for *The Virginia Company of London Wants You!*

Name _____

Date _____



Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the brochure to make sure <ul style="list-style-type: none"> it had two folds it met the size requirements it contained headings to emphasize various sections it used a variety of print styles, print sizes, and colors it had appropriate illustrations it stressed the positive reasons for making the trip. 					
The student tested the brochure for correct <ul style="list-style-type: none"> grammar capitalization punctuation spelling. 					
The student evaluated how he/she could make it better next time.					

Rubric for *The Virginia Company of London Wants You!*

Name _____

Date _____

Oral Communication Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
4.1 The student will use effective communication skills in a variety of settings.					
a) Present accurate directions to individuals and small groups.					
b) Contribute to group discussions.					
c) Seek ideas and opinions of others.					
d) Use evidence to support opinions.					
e) Use grammatically correct language and specific vocabulary to communicate ideas.					
4.2 The student will make and listen to oral presentations and reports.					
a) Use subject-related information and vocabulary.					
b) Listen to and record information.					
c) Organize information for clarity.					



Standards of Learning

English (2002)

Oral Language

- 4.1 The student will use effective oral communication skills in a variety of settings.
 - a) Present accurate directions to individuals and small groups.
 - b) Contribute to group discussions.
 - c) Seek the ideas and opinions of others.
 - d) Use evidence to support opinions.
 - e) Use grammatically correct language and specific vocabulary to communicate ideas.
- 4.2 The student will make and listen to oral presentations and reports.
 - a) Use subject-related information and vocabulary.
 - b) Listen to and record information.
 - c) Organize information for clarity.

Reading

- 4.5 The student will read and demonstrate comprehension of nonfiction.
 - a) Use text organizers such as type, headings, and graphics to predict and categorize information.
 - b) Formulate questions that might be answered in the selection.
 - c) Explain the author's purpose.
 - d) Make literal inferences using information from texts.
 - e) Draw conclusions using information from texts.
 - f) Summarize content of selection, identifying important ideas and providing details for each important idea.
 - g) Describe relationship between content and previously learned concepts or skills.
 - h) Distinguish between cause and effect and between fact and opinion.
 - i) Identify new information gained from reading.
- 4.6 The student will demonstrate comprehension of information resources to research a topic.
 - a) Construct questions about a topic.
 - b) Collect information using the resources of the media center including online, print, and media resources.
 - c) Evaluate and synthesize information.

English (2002), continued

Writing

- 4.7 The student will write effective narratives and explanations.
- a) Focus on one aspect of a topic.
 - b) Develop a plan for writing.
 - c) Organize writing to convey a central idea.
 - d) Write several related paragraphs on the same topic.
 - e) Utilize elements of style, including word choice and sentence variation.
 - f) Write rhymed, unrhymed, and patterned poetry.
 - g) Use available technology.
- 4.8 The student will edit writing for correct capitalization, spelling, punctuation, and sentence structure.
- a) Use subject-verb agreement.
 - b) Include prepositional phrases.
 - c) Eliminate double negatives.
 - d) Use noun/pronoun agreement.
 - e) Use commas in series, dates, and addresses.
 - f) Incorporate adjectives and adverbs.
 - g) Use the articles *a*, *an*, and *the* correctly.
 - h) Use correct spelling for frequently used words, including common homophones.

Mathematics (2001)

Measurement

- 4.11 The student will
- a) estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, millimeters, centimeters, and meters;
 - b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters); and
 - c) estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than 1 yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). *
- * *The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*
- 4.13 The student will
- a) identify and describe situations representing the use of perimeter and area; and
 - b) use measuring devices to find perimeter in both standard and nonstandard units of measure.

History and Social Science (2001)

Colonization and Conflict: 1607 through the American Revolution

- VS.3 The student will demonstrate knowledge of the first permanent English settlement in America by
- a) explaining the reasons for English colonization;
 - b) describing how geography influenced the decision to settle at Jamestown;
 - c) identifying the importance of the charters of the Virginia Company of London in establishing the Jamestown settlement;
 - d) identifying the importance of the Virginia Assembly(1619) as the first representative legislative body in English America;
 - e) identifying the importance of the arrival of Africans and women to the Jamestown settlement;
 - f) describing the hardships faced by settlers at Jamestown and the changes that took place to ensure survival;
 - g) describing the interactions between the English settlers and the Powhatan people, including the contributions of the Powhatans to the survival of the settlers.
- VS.4 The student will demonstrate knowledge of life in the Virginia colony by
- a) explaining the importance of agriculture and its influence on the institution of slavery;
 - b) describing how European (English, Scotch-Irish, German) immigrants, Africans, and American Indians (First Americans) influenced the cultural landscape and changed the relationship between the Virginia colony and England;
 - c) explaining how geography influenced the relocation of Virginia's capital from Jamestown to Williamsburg to Richmond;
 - d) describing how money, barter, and credit were used.

Standards for Technological Literacy

- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 11: Students will develop the abilities to apply the design process.

Pack Your Trunk



Background: You have decided to sail to Jamestown. You are allowed only one trunk to carry all of the things you will need to survive when you reach the settlement. Use your knowledge of Virginia history to help you make a list of things you should take. Your teacher will tell you how to represent the items that will go into your trunk.

Design Challenge: Design and build a trunk to hold the items you must take with you on your trip to the Jamestown colony. Because of space restrictions, the trunk must be built to contain between 36 and 60 cubic inches of space. To make loading the trunks onto the ship easier, all of the edges and sides of the trunk should be parallel and perpendicular to the other edges and the height of your trunk must measure less than the width.

Criteria:

Your trunk should

- hold a volume greater than 36 cubic inches and less than 60 cubic inches
- have edges that are parallel and perpendicular to other edges
- be wider than it is tall
- have a top that will stay closed if the trunk is turned on its side or upside down
- have a means of carrying it.

Materials: You may select from the items below.

- | | | |
|-------------------|-----------------|-----------------------|
| • cardboard | • pipe cleaners | • egg cartons |
| • cardboard tubes | • card stock | • craft sticks |
| • glue/paste | • straws | • 12 inches of string |
| • poster board | • scissors | • no tape of any kind |

Targeted Standard of Learning: Mathematics 4.16
Supporting Standards of Learning: Mathematics 4.11, 4.12
History and Social Science VS.3, VS.4
English 4.1, 4.2, 4.5, 4.6

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Pack Your Trunk



Targeted Standard of Learning: Mathematics 4.16

- The student will identify lines which illustrate intersection, parallelism, and perpendicularity.

Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to targeted Mathematics Standard of Learning 4.16 Some understanding of the design process 	<ul style="list-style-type: none"> Check Design Brief for recommended materials. Teacher may substitute materials. Following the teacher's directions, students should make a list of the items that need to be packed. Students could draw pictures or make small models of items to be placed in the trunk. 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Small groups or pairs Each student keeps own Guided Portfolio. Teacher should approve plans before students begin building. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessments 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (45 min.) Session 2: Building (60 min.) Session 3: Sharing and evaluating (45 min.)

Name _____

Pack Your Trunk



Group Members: _____

1. **What is the problem?** State the problem in *your own words*.

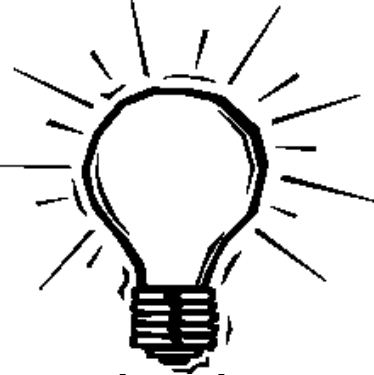
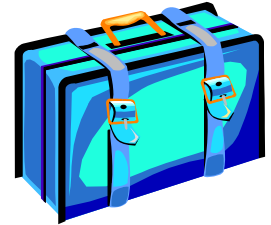
Targeted Standard of Learning: Mathematics 4.16
Supporting Standards of Learning: Mathematics 4.11, 4.12
History and Social Science VS.3, VS.4
English 4.1, 4.2, 4.5, 4.6

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.



Name _____

3. Create the solution you think is best.

Keep notes below about the problems you have and how you solve them.



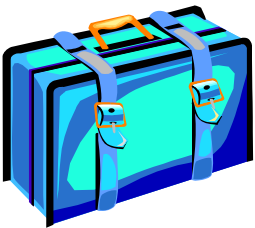
Name _____

4. Test your solution.

- Does your trunk hold a volume greater than 36 cubic inches and less than 60 cubic inches?
YES NO
- Is your trunk wider than it is tall?
YES NO
- Are the edges of your trunk all parallel and perpendicular to other edges?
YES NO
- Does the top stay closed if the trunk is turned on its side or upside down?
YES NO
- Does your trunk have a means of carrying it?
YES NO



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

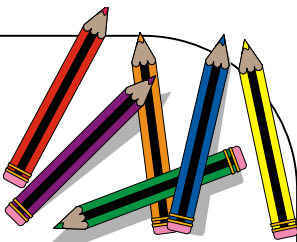
Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Pack Your Trunk*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the trunk to make sure <ul style="list-style-type: none"> it held a volume greater than 36 cubic inches and less than 60 cubic inches it was wider than it was tall that the edges were parallel and perpendicular the top stayed closed when it was turned upside down it had a means of carrying it. 					
The student evaluated how he/she could make it better next time.					



Rubric for *Pack Your Trunk*

Name _____

Date _____

Oral Communication Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
4.1 The student will use effective communication skills in a variety of settings. a) Present accurate directions to individuals and small groups. b) Contribute to group discussions c) Seek ideas and opinions of others. d) Use evidence to support opinions. e) Use grammatically correct language and specific vocabulary to communicate ideas.					
4.2 The student will make and listen to oral presentations and reports. a) Use subject-related information and vocabulary. b) Listen to and record information. c) Organize information for clarity.					



Standards of Learning

English (2002)

Oral Language

- 4.1 The student will use effective oral communication skills in a variety of settings.
 - a) Present accurate directions to individuals and small groups.
 - b) Contribute to group discussions.
 - c) Seek the ideas and opinions of others.
 - d) Use evidence to support opinions.
 - e) Use grammatically correct language and specific vocabulary to communicate ideas.
- 4.2 The student will make and listen to oral presentations and reports.
 - a) Use subject-related information and vocabulary.
 - b) Listen to and record information.
 - c) Organize information for clarity.

Reading

- 4.5 The student will read and demonstrate comprehension of nonfiction.
 - a) Use text organizers such as type, headings, and graphics to predict and categorize information.
 - b) Formulate questions that might be answered in the selection.
 - c) Explain the author's purpose.
 - d) Make literal inferences using information from texts.
 - e) Draw conclusions using information from texts.
 - f) Summarize content of selection, identifying important ideas and providing details for each important idea.
 - g) Describe relationship between content and previously learned concepts or skills.
 - h) Distinguish between cause and effect and between fact and opinion.
 - i) Identify new information gained from reading.
- 4.6 The student will demonstrate comprehension of information resources to research a topic.
 - a) Construct questions about a topic.
 - b) Collect information using the resources of the media center including online, print, and media resources.
 - c) Evaluate and synthesize information.

Mathematics (2001)

Measurement

4.11 The student will

- a) estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, millimeters, centimeters, and meters;
- b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters); and
- c) estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than 1 yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). *

** The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

4.12 The student will

- a) estimate and measure liquid volume, using actual measuring devices and using metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters;
- b) identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons) and between units within the metric system (milliliters and liters); and
- c) estimate the conversion of quarts and liters, using approximate comparisons (1 quart is a little less than 1 liter, 1 liter is a little more than 1 quart).*

** The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U. S. Customary and metric unit.*

Geometry

4.16 The student will identify and draw representations of lines that illustrate intersection, parallelism, and perpendicularity.

History and Social Science (2001)

Colonization and Conflict: 1607 through the American Revolution

VS.3 The student will demonstrate knowledge of the first permanent English settlement in America by

- a) explaining the reasons for English colonization;
- b) describing how geography influenced the decision to settle at Jamestown;
- c) identifying the importance of the charters of the Virginia Company of London in establishing the Jamestown settlement;
- d) identifying the importance of the Virginia Assembly(1619) as the first representative legislative body in English America;
- e) identifying the importance of the arrival of Africans and women to the Jamestown settlement;
- f) describing the hardships faced by settlers at Jamestown and the changes that took place to ensure survival;
- g) describing the interactions between the English settlers and the Powhatan people, including the contributions of the Powhatans to the survival of the settlers.

History and Social Science (2001) continued

Colonization and Conflict: 1607 through the American Revolution

VS.4 The student will demonstrate knowledge of life in the Virginia colony by

- a) explaining the importance of agriculture and its influence on the institution of slavery;
- b) describing how European (English, Scotch-Irish, German) immigrants, Africans, and American Indians (First Americans) influenced the cultural landscape and changed the relationship between the Virginia colony and England;
- c) explaining how geography influenced the relocation of Virginia's capital from Jamestown to Williamsburg to Richmond;
- d) describing how money, barter, and credit were used.

Standards for Technological Literacy

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Standard 11: Students will develop the abilities to apply the design process.

Light Your Way



Background: You have been invited to join a group of scientists who are going to investigate a newly discovered cave in Virginia. There is one condition to your going on this adventure. You are required to design, build, and bring a lantern that will help you see where you are going and allow you to keep your hands free for climbing and digging. You will also be asked to present a diagram showing how your lantern works.

Design Challenge: Design and build a lantern that you can wear on your expedition to light your way without using your hands to hold it. Your lantern should be designed to point ahead of you when you walk, to have an on/off switch to conserve energy, and to be comfortable to wear. Remember to prepare a final labeled sketch to show the scientists, and be prepared to explain how your lantern works.

Criteria:

Your lantern must

- be wearable and keep your hands free
- have an on/off switch
- light the way ahead of you
- be accompanied by a labeled diagram showing how it was made
- stay lit for at least 15 minutes while you wear it in class.

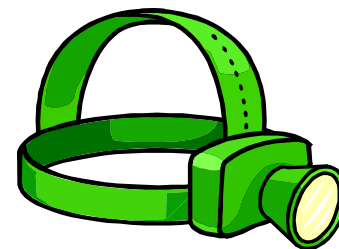
Materials: You may select from the items below.

- C battery
- AA battery
- film canister
- bell wire
- electrical tape
- masking tape
- bulb
- bulb holder
- brass fasteners
- paper clips
- Christmas tree lights
- wire cutter
- card stock
- wire stripper
- cardboard
- string
- general art supplies

Targeted Standard of Learning: Science 4.3
Supporting Standards of Learning: Science 4.1
Mathematics 4.11
English 4.1, 4.2, 4.5, 4.6

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Light Your Way



Targeted Standard of Learning: Science 4.3

- The student will investigate and understand the characteristics of electricity.

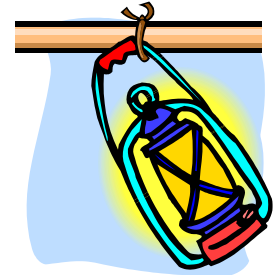
Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to targeted Science Standard of Learning 4.3 Specific lessons on circuits, wires, and switches. Students can apply what they have learned in class. Some understanding of the design process 	<ul style="list-style-type: none"> Check Design Brief for recommended materials. Teacher may substitute materials. Paper fasteners must be made of brass to work. Check the box label. Film canisters can be obtained from photo centers for free. Canisters with flat tops work best. Time Savers: <ul style="list-style-type: none"> Precut and strip wire. Put materials needed by each group into a tray, box, or small bag prior to class. This helps with quantity control and helps provide quick transition into the activity. Poke one hole through each end of the film canisters using a round file. Students may bring a hat, belt, or shirt with a pocket to help support their lanterns. Allow students to come up with these ideas or others when they brainstorm different designs. 	<ul style="list-style-type: none"> Discuss the dangers of electricity in real-life situations. Keep away from water. Use wire-cutting tools safely. Use eye protection. If you have concerns about the students using the wire cutting tools precut the wire and strip the ends prior to class. 	<ul style="list-style-type: none"> Small groups or pairs Each student keeps own Guided Portfolio. Each group member needs to complete a light following the group's plans. Teacher should approve plans before students begin building. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Final sketch form Rubric Assessments 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (60 min.) Session 2: Building (60 min.) Session 3: Sharing and evaluating (60 min.)

Name _____

Light Your Way



Group Members: _____

1. **What is the problem?** State the problem in *your own words*.

Targeted Standard of Learning: Science 4.3
Supporting Standards of Learning: Science 4.1
Mathematics 4.11
English 4.1, 4.2, 4.5, 4.6

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

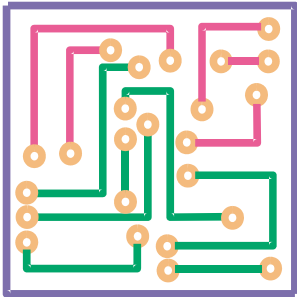
Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.



Name _____



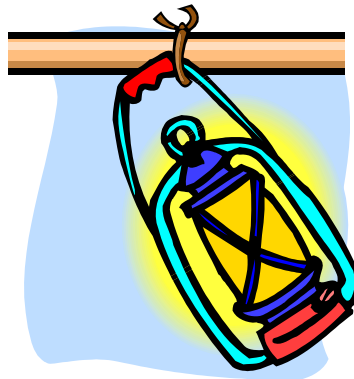
3. Create the solution you think is best.

Keep notes below about the problems you have and how you solve them.

Name _____

4. Test your solution.

- | | | |
|---|-----|----|
| • Is your lantern wearable without using your hands to hold it? | YES | NO |
| • Does your lantern have an on/off switch? | YES | NO |
| • Does your lantern light the way in front of you? | YES | NO |
| • Is your lantern accompanied by a labeled diagram showing how it was made? | YES | NO |
| • Does your lantern stay lit for at least 15 minutes while you are wearing it in class? | YES | NO |



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

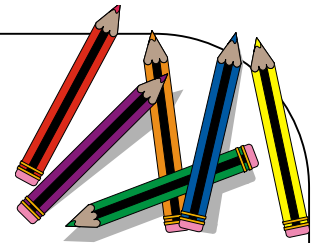
Guided Portfolio—6

Name _____

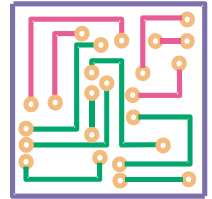
Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____



Sketch: Light Your Way

Draw a diagram of the circuit that you created. Carefully label all of the parts and how they work. The sketch should be detailed enough for someone else to understand it and be able to create a lantern exactly like yours.

Rubric for *Light Your Way*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student prepared a final labeled sketch to show exactly how he/she built the lantern.					
The student tested the lantern to make sure <ul style="list-style-type: none"> • it was wearable and did not require hands to hold it • it had an on/off switch • it lighted the way in front of the wearer • it stayed lit for at least 15 minutes while being worn in class. 					
The student evaluated how he/she could make it better next time.					



Rubric for *Light Your Way*

Name _____

Date _____

Oral Communication Rubric	no evidence	limited understanding	some understanding with room for improvement	good understanding with room for improvement	substantial understanding
	0	1	2	3	4
4.1 The student will use effective communication skills in a variety of settings. a) Present accurate directions to individuals and small groups. b) Contribute to group discussions c) Seek ideas and opinions of others. d) Use evidence to support opinions. e) Use grammatically correct language and specific vocabulary to communicate ideas.					
4.2 The student will make and listen to oral presentations and reports. a) Use subject-related information and vocabulary. b) Listen to and record information. c) Organize information for clarity.					



Standards of Learning

English (2002)

Oral Language

- 4.1 The student will use effective oral communication skills in a variety of settings.
 - a) Present accurate directions to individuals and small groups.
 - b) Contribute to group discussions.
 - c) Seek the ideas and opinions of others.
 - d) Use evidence to support opinions.
 - e) Use grammatically correct language and specific vocabulary to communicate ideas.
- 4.2 The student will make and listen to oral presentations and reports.
 - a) Use subject-related information and vocabulary.
 - b) Listen to and record information.
 - c) Organize information for clarity.

Reading

- 4.5 The student will read and demonstrate comprehension of nonfiction.
 - a) Use text organizers such as type, headings, and graphics to predict and categorize information.
 - b) Formulate questions that might be answered in the selection.
 - c) Explain the author's purpose.
 - d) Make literal inferences using information from texts.
 - e) Draw conclusions using information from texts.
 - f) Summarize content of selection, identifying important ideas and providing details for each important idea.
 - g) Describe relationship between content and previously learned concepts or skills.
 - h) Distinguish between cause and effect and between fact and opinion.
 - i) Identify new information gained from reading.
- 4.6 The student will demonstrate comprehension of information resources to research a topic.
 - a) Construct questions about a topic.
 - b) Collect information using the resources of the media center including online, print, and media resources.
 - c) Evaluate and synthesize information.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 4.1 The student will plan and conduct investigations in which
- a) distinctions are made among observations, conclusions, inferences, and predictions;
 - b) hypotheses are formulated based on cause and effect relationships;
 - c) variables that must be held constant in an experimental situation are defined;
 - d) appropriate instruments are selected to measure linear distance, volume, mass, and temperature;
 - e) appropriate metric measures are used to collect, record, and report data;
 - f) data are displayed using bar and basic line graphs;
 - g) numerical data that are contradictory or unusual in experimental results are recognized; and
 - h) predictions are made based on data from picture graphs, bar graphs, and basic line graphs;

Force, Motion, and Energy

- 4.3 The student will investigate and understand the characteristics of electricity. Key concepts include
- a) conductors and insulators;
 - b) basic circuits (open/closed, parallel/series);
 - c) static electricity ;
 - d) the ability of electrical energy to be transformed into heat, light, and mechanical energy;
 - e) simple electromagnets and magnetism; and
 - f) historical contributions in understanding electricity.

Mathematics (2001)

Measurement

- 4.11 The student will
- a) estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, millimeters, centimeters, and meters;
 - b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters); and
 - c) estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than 1 yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). *
- * The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

Standards for Technological Literacy

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Standard 11: Students will develop the abilities to apply the design process.

Understanding Life in Jamestown



Background: You have been studying Jamestown and its place in history as the first permanent English settlement in America. Learn why and where the colony was built, what was used to build the fort, how the buildings were constructed, and what kind of tools were used. Take notes on the important things you learn. Be able to compare the technology of the time to the technology of present-day Virginia. Use a KWL format to help guide your research.

Design Challenge: Design and build a model of the first Jamestown settlement. Your model should represent the original design of the fort with walls, a main gate facing the correct direction, and bulwarks. There should be room inside for appropriate buildings as well as the tools and other belongings the settlers used in their day-to-day life. The base of the model should be no larger than three square feet. Include the use of simple machines (wheel and axle, inclined plane, lever, wedge, pulley, and screw) in your design. This may be done by building working miniatures of items that may have been found at the original fort.

Criteria:

Your model should

- sit on a base no greater than 3 feet by 3 feet
- represent the design of the original fort
- contain at least one building inside the fort
- have simple machines incorporated into the building of the fort or represented by miniatures that you build.

Materials: You may select from the items below.

- cardboard
- construction paper
- card stock
- poster board
- brads
- paper clips
- craft sticks
- straws
- pipe cleaners
- 3 feet of string
- 12 inches of tape
- general art supplies (markers, colored pencils, crayons, scissors, rulers, paint, and glue)

Targeted Standard of Learning: History and Social Science VS.3
Supporting Standards of Learning: History and Social Science VS.1
Science 4.1
Mathematics 4.11
English 4.1, 4.2, 4.5, 4.6

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Understanding Life in Jamestown



Targeted Standard of Learning: History VS.3

- The student will demonstrate knowledge of the first permanent English settlement in America by
 - a) explaining the reasons for English colonization;
 - b) describing how geography influenced the decision to settle at Jamestown;
 - c) identifying the importance of the charters of the Virginia Company of London in establishing the Jamestown settlement;
 - d) identifying the importance of the Virginia Assembly(1619) as the first representative legislative body in English America;
 - e) identifying the importance of the arrival of Africans and women to the Jamestown settlement;
 - f) describing the hardships faced by settlers at Jamestown and the changes that took place to ensure survival;
 - g) describing the interactions between the English settlers and the Powhatan people, including the contributions of the Powhatans to the survival of the settlers.

Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure and on-going involvement in targeted History and Social Science Standard of Learning VS.3 Knowledge of simple machines Some understanding of the design process 	<ul style="list-style-type: none"> Check Design Brief for recommended materials. Teachers may substitute materials. Special Hint: Groups should create a plan as a team and then divide the construction work among them. For example, two members of the group might work on the fort while the others work on the miniatures to go inside the fort. As each team member finishes up a job, he or she helps other group members. 	<ul style="list-style-type: none"> Supervise cutting of craft sticks and pipe cleaners. 	<ul style="list-style-type: none"> Small groups of four or fewer Each child keeps own Guided Portfolio. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessments 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (60 min.) Sessions 2 and 3: Building (45 min. each) Session 4: Sharing and evaluating (60 min.)

Name _____

Understanding Life in Jamestown



Group Members: _____

1. **What is the problem?** State the problem in *your own words*.

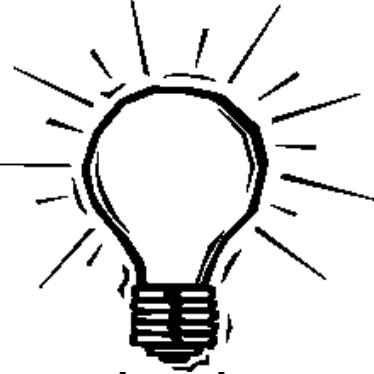
Targeted Standard of Learning: History and Social Science VS.3
Supporting Standards of Learning: History and Social Science VS.1
Science 4.1
Mathematics 4.11
English 4.1, 4.2, 4.5, 4.6

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11

Name _____

2. Brainstorm solutions.

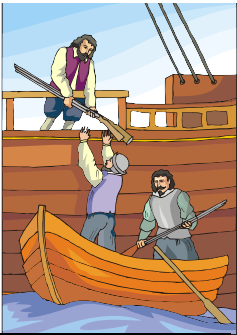
Draw or describe some possible solutions.



Name _____

3. Create the solution you think is best.

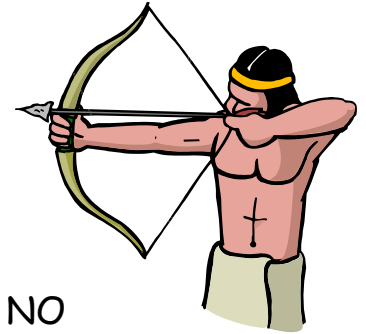
Keep notes below about the problems you have and how you solve them.



Name _____

4. Test your solution.

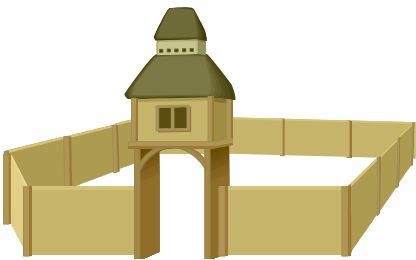
- Is the base of your model no greater than 3 feet by 3 feet? YES NO
- Does your model represent the design of the original fort? YES NO
- Does your model contain at least one building inside? YES NO
- Does your model have examples of simple machines incorporated into the building of the fort or represented by miniatures that you built? YES NO



Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

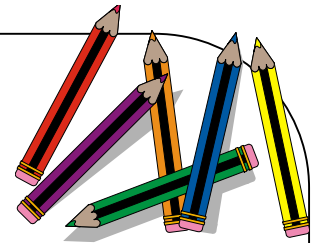
Guided Portfolio—6

Name _____

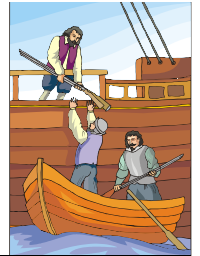
Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____



KWL: Understanding Life in Jamestown

What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p>Note: The teacher should make sure that all required information is listed in question form on the "W" (what we want to learn) section of the KWL. Use your <i>Virginia SOL Teacher Resource Guide</i> to check what knowledge, skills, and processes are considered essential for supporting the History and Social Science Standards of Learning VS1 and VS3. When necessary refer to the Resource Guide for previous grade levels.</p>	

Targeted Standard of Learning: History and Social Science VS.3
 Supporting Standards of Learning: History and Social Science VS.1
 Science 4.1,
 Mathematics 4.11
 English 4.1, 4.2, 4.5, 4.6

Targeted Standard for Technological Literacy: 9
 Supporting Standards for Technological Literacy: 8, 10, 11

Rubric for *Understanding Life in Jamestown*

Name _____

Date _____



Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the model to make sure <ul style="list-style-type: none"> it sat on a base no greater than three feet square it was modeled after the design of the original fort it contained at least one building inside. 					
The student tested the model to make sure it had a/an <ul style="list-style-type: none"> wheel and axle inclined plane lever wedge pulley screw. 					
The student evaluated how he/she could make it better next time.					

Rubric for *Understanding Life in Jamestown*

Name _____

Date _____

Oral Communication Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
4.1 The student will use effective communication skills in a variety of settings. a) Present accurate directions to individuals and small groups. b) Contribute to group discussions. c) Seek ideas and opinions of others. d) Use evidence to support opinions. e) Use grammatically correct language and specific vocabulary to communicate ideas.					
4.2 The student will make and listen to oral presentations and reports. a) Use subject-related information and vocabulary. b) Listen to and record information. c) Organize information for clarity.					



Standards of Learning

English (2002)

Oral Language

- 4.1 The student will use effective oral communication skills in a variety of settings.
 - a) Present accurate directions to individuals and small groups.
 - b) Contribute to group discussions.
 - c) Seek the ideas and opinions of others.
 - d) Use evidence to support opinions.
 - e) Use grammatically correct language and specific vocabulary to communicate ideas.
- 4.2 The student will make and listen to oral presentations and reports.
 - a) Use subject-related information and vocabulary.
 - b) Listen to and record information.
 - c) Organize information for clarity.

Reading

- 4.5 The student will read and demonstrate comprehension of nonfiction.
 - a) Use text organizers, such as type, headings, and graphics, to predict and categorize information.
 - b) Formulate questions that might be answered in the selection.
 - c) Explain the author's purpose.
 - d) Make literal inferences using information from texts.
 - e) Draw conclusions using information from texts.
 - f) Summarize content of selection, identifying important ideas and providing details for each important idea.
 - g) Describe relationship between content and previously learned concepts or skills.
 - h) Distinguish between cause and effect and between fact and opinion.
 - i) Identify new information gained from reading.
- 4.6 The student will demonstrate comprehension of information resources to research a topic.
 - a) Construct questions about a topic.
 - b) Collect information using the resources of the media center, including online, print, and media resources.
 - c) Evaluate and synthesize information.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 4.1 The student will plan and conduct investigations in which
- a) distinctions are made among observations, conclusions, inferences, and predictions;
 - b) hypotheses are formulated based on cause and effect relationships;
 - c) variables that must be held constant in an experimental situation are defined;
 - d) appropriate instruments are selected to measure linear distance, volume, mass, and temperature;
 - e) appropriate metric measures are used to collect, record, and report data;
 - f) data are displayed using bar and basic line graphs;
 - g) numerical data that are contradictory or unusual in experimental results are recognized; and
 - h) predictions are made based on data from picture graphs, bar graphs, and basic line graphs;

Mathematics (2001)

Measurement

- 4.11 The student will
- a) estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, millimeters, centimeters, and meters;
 - b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters); and
 - c) estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than 1 yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). *
- * The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

History and Social Science (2001)

Virginia Studies

Skills

- VS.1 The student will develop skills for historical and geographical analysis including the ability to
- a) identify and interpret artifacts and primary and secondary source documents to understand events in history;
 - b) determine cause and effect relationships;
 - c) compare and contrast historical events;
 - d) draw conclusions and make generalizations;
 - e) make connections between past and present;
 - f) sequence events in Virginia history;
 - g) interpret ideas and events from different historical perspectives;

History and Social Science (2001) continued

Virginia Studies

Skills

- h) evaluate and discuss issues orally and in writing;
- i) analyze and interpret maps to explain relationships among landforms, water features, climatic characteristics, and historical events.

Colonization and Conflict: 1607 through the American Revolution

VS.3 The student will demonstrate knowledge of the first permanent English settlement in America by

- a) explaining the reasons for English colonization;
- b) describing how geography influenced the decision to settle at Jamestown;
- c) identifying the importance of the charters of the Virginia Company of London in establishing the Jamestown settlement;
- d) identifying the importance of the Virginia Assembly(1619) as the first representative legislative body in English America;
- e) identifying the importance of the arrival of Africans and women to the Jamestown settlement;
- f) describing the hardships faced by settlers at Jamestown and the changes that took place to ensure survival;
- g) describing the interactions between the English settlers and the Powhatan people, including the contributions of the Powhatans to the survival of the settlers.

Standards for Technological Literacy

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

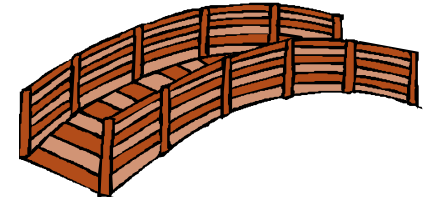
Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Standard 11: Students will develop the abilities to apply the design process.

Build a Bridge

Based on the book

Bridge to Terabithia by Katherine Paterson



Background: You have just completed reading the book Bridge to Terabithia. Jess has asked for your help. To make sure everyone can cross the creek safely, you are to design and build a model of a bridge that Jess could use to get to Terabithia. You should do some research on bridges before you begin your portfolio.

Design Challenge: First, share your ideas with your partner. Write your ideas in the brainstorming section of the portfolio. Each partner should sketch at least one idea for a bridge to cross to Terabithia. After sketching some ideas, choose one to build with your partner.

Criteria:

Your bridge must

- be at least 12" long
- support two pounds (or equivalent metric weight)
- hold the weight for at least five minutes
- be made with recycled materials
- be colorful and attractive
- have a way to get onto and off of the bridge
- include labeled and measured right, acute, or obtuse angles.

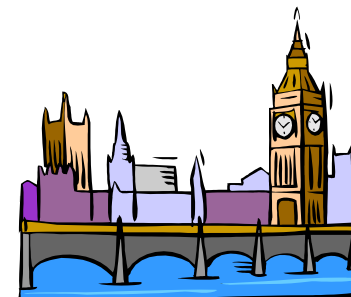
Materials: You may select from the items below.

- cardboard
- cardboard tubes
- paper clips
- styrofoam
- straws
- general art supplies
- 1 foot of tape
- construction paper
- egg cartons
- craft sticks
- 1 yard of string
- poster board

Targeted Standards of Learning: English 5.5, 5.7, 5.8
Supporting Standards of Learning: English 5.1, 5.3, 5.6
Science 5.1
Mathematics 5.13, 5.14

Targeted Standards of Technological Literacy: 18, 20
Supporting Standards of Technological Literacy: 1, 9

Build a Bridge



Targeted Standards of Learning: English 5.5, 5.7, and 5.8

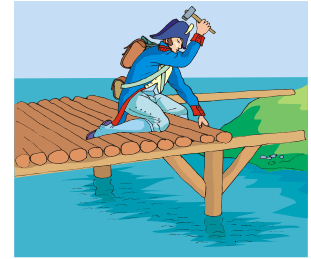
- The student will read and demonstrate comprehension of fiction.
- The student will demonstrate comprehension of information from a variety of print resources.
- The student will write for a variety of purposes: to describe, to inform, to entertain, and to explain.

Targeted Standards of Technological Literacy: Standard 18 and 20

- Students will develop an understanding of and be able to select and use transportation technologies.
- Students will develop an understanding of and be able to select and use construction technologies.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Completed reading of <u>Bridge to Terabithia</u> by Katherine Paterson • Some understanding of the design process • Some background research and knowledge of bridges 	<ul style="list-style-type: none"> • See Design Brief for recommended materials. Teachers may substitute materials. • <u>Bridge to Terabithia</u> by Katherine Paterson • Two-pound weight or metric equivalent • Reference materials on bridges 	<ul style="list-style-type: none"> • Insure cleanliness of found and recycled materials 	<ul style="list-style-type: none"> • Works best in groups of two but no more than four 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio • Rubric Assessment • KWL 	<ul style="list-style-type: none"> • Session 1: Introducing Design Brief and Portfolio (30 min.) • Sessions 2 and 3: Building and Portfolio work (30 min. each) • Session 4: Testing, sharing, and evaluating (45 min.)

Name _____



Build a Bridge

Group Members: _____

1. What is the problem? State the problem in *your own words*.

Targeted Standards of Learning: English 5.5, 5.7, 5.8
Supporting Standards of Learning: English 5.1, 5.3, 5.6
Science 5.1
Mathematics 5.13, 5.14

Targeted Standards of Technological Literacy: 18, 20
Supporting Standards of Technological Literacy: 1, 9

Name _____

2. Research: Build a Bridge

Describe each of the following types of bridges:

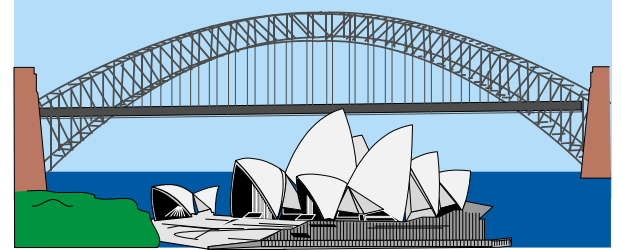
Beam bridge _____

Suspension bridge _____

Cantilever bridge _____

Arch bridge _____

Other notes about bridges _____

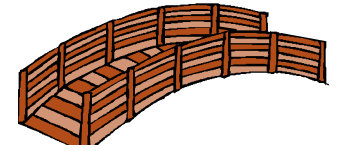


Name _____

3. Brainstorm solutions.

Draw or describe some possible solutions.





4. Planning: Build a Bridge

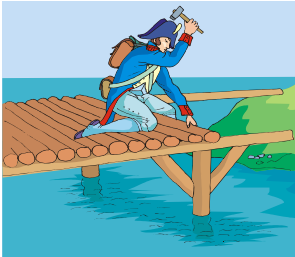
Choose one of the ideas to build. Draw a final sketch of the bridge you plan to make. Make sure you label all the parts with materials you think you will use.

A large, empty rectangular box with rounded corners, outlined in black. It is intended for the student to draw a final sketch of their bridge design.

Name _____

5. Create the solution you think is best.

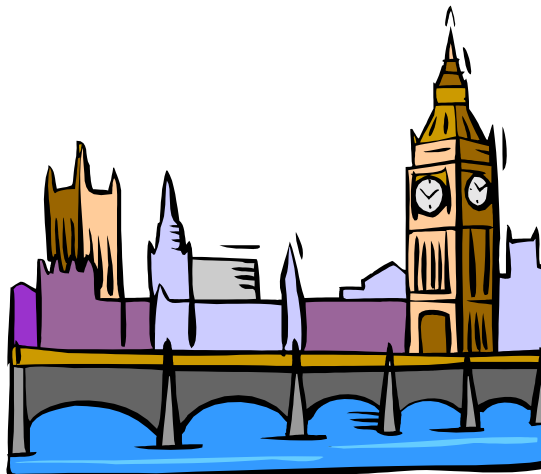
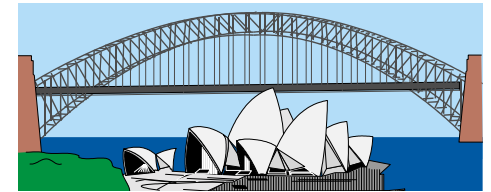
Keep notes below about the problems you have and how you solve them.



Name _____

6. Test your solution.

- | | | |
|--|-----|----|
| • Is your bridge at least 12" long? | YES | NO |
| • Does your bridge support at least two pounds or the metric equivalent? | YES | NO |
| • Does your bridge hold this weight for at least five minutes? | YES | NO |
| • Does your bridge contain right, acute, or obtuse angles? | YES | NO |
| • Is there a way to get onto and off of your bridge? | YES | NO |
| • Is your project neat and colorful? | YES | NO |



Name _____

7. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

8. My "Bridge to Terabithia"

Draw a picture of your completed bridge.

Take a digital picture of it and include the picture in your portfolio.

Describe how you made it. Include how you cut and joined the materials. What materials did you actually use?



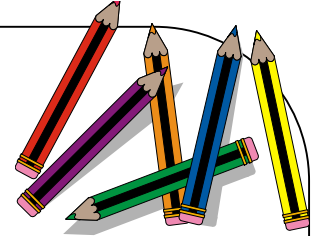
Guided Portfolio—9

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.

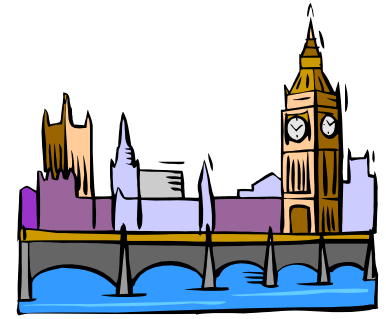


How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____

KWL: Build a Bridge



What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p>Sample Questions</p> <p>What are some different kinds of bridges?</p> <p>What materials are used to build bridges?</p> <p>What are the names of several famous bridges?</p>	

Targeted Standards of Learning: English 5.5, 5.7, 5.8
Supporting Standards of Learning: English 5.1, 5.3, 5.6
Science 5.1
Mathematics 5.13, 5.14

Targeted Standards of Technological Literacy: 18, 20
Supporting Standards of Technological Literacy: 1, 9

Rubric for *Build a Bridge*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the bridge to make sure <ul style="list-style-type: none"> it spanned 12 inches it held two pounds or equivalent metric weight for at least five minutes. 					
The student's portfolio bridge drawing included angles and triangles that were labeled right, acute, or obtuse.					
The student made sure there was a way onto and off of the bridge.					
The student created a neat and colorful project.					
The student evaluated how he/she could make it better next time.					



Rubric for *Build a Bridge*

Name _____

Date _____



Oral Communication Rubric		no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities. a) Participate in and contribute to discussions across content areas. b) Organize information to present reports of group activities. c) Summarize information gathered in group activities.						
5.2 The student will use effective nonverbal communication skills. a) Maintain eye contact with listeners. b) Use gestures to support, accentuate, and dramatize verbal message. c) Use posture appropriate for communication setting.						
5.3 The student will make planned oral presentations. a) Determine appropriate content for audience. b) Organize content sequentially or around major ideas. c) Summarize main points before or after presentation. d) Incorporate visual aids to support the presentation. e) Use grammatically correct language and specific vocabulary.						

Standards of Learning

English (2002)

Oral Language

- 5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities.
 - a) Participate in and contribute to discussions across content areas.
 - b) Organize information to present reports of group activities.
 - c) Summarize information gathered in group activities.
- 5.3 The student will make planned oral presentations.
 - a) Determine appropriate content for audience.
 - b) Organize content sequentially or around major ideas.
 - c) Summarize main points before or after presentation.
 - d) Incorporate visual aids to support the presentation.
 - e) Use grammatically correct language and specific vocabulary

Reading

- 5.5 The student will read and demonstrate comprehension of fiction.
 - a) Describe the relationship between text and previously read materials.
 - b) Describe character development in fiction and poetry selections.
 - c) Describe the development of plot and explain how conflicts are resolved.
 - d) Describe the characteristics of free verse, rhymed, and patterned poetry.
 - e) Describe how author's choice of vocabulary and style contribute to the quality and enjoyment of selections.
- 5.6 The student will read and demonstrate comprehension of nonfiction.
 - a) Use text organizers, such as type, headings, and graphics, to predict and categorize information.
 - b) Identify structural patterns found in nonfiction.
 - c) Locate information to support opinions, predictions, and conclusions.
 - d) Identify cause-and-effect relationships.
 - e) Identify compare-and-contrast relationships.
 - f) Skim materials to develop a general overview of content and to locate specific information.
 - g) Identify new information gained from reading.
- 5.7 The student will demonstrate comprehension of information from a variety of print resources.
 - a) Develop notes that include important concepts, summaries, and identification of information sources.
 - b) Organize information on charts, maps, and graphs.

English (2002) continued

Writing

- 5.8 The student will write for a variety of purposes: to describe, to inform, to entertain, and to explain.
- a) Choose planning strategies for various writing purposes.
 - b) Organize information.
 - c) Demonstrate awareness of intended audience.
 - d) Use precise and descriptive vocabulary to create tone and voice.
 - e) Vary sentence structure.
 - f) Revise writing for clarity.
 - g) Use available technology to access information.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 5.1 The student will plan and conduct investigations in which
- a) rocks, minerals, and organisms are identified using a classification key;
 - b) estimations of length, mass, and volume are made.
 - c) appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;
 - d) accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);
 - e) data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams);
 - f) predictions are made using patterns, and simple graphical data are extrapolated;
 - g) manipulated and responding variables are identified; and
 - h) an understanding of the nature of science is developed and reinforced.

Mathematics (2001)

Measurement

- 5.13 The student will measure and draw right, acute, and obtuse angles and triangles, using appropriate tools.

Geometry

- 5.14 The student will classify angles and triangles as right, acute, or obtuse.

Standards for Technological Literacy

- Standard 1: Students will develop an understanding of the characteristics and scope of technology.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.
- Standard 20: Students will develop an understanding of and be able to select and use construction technologies.

Playground Construction

Background: Your school has decided to build a new playground. Your class has been asked to design and build a model of a playground area that students would enjoy. Each person will decide on one structure to build for the playground. Each structure should be different from the others. Using the Internet and other resources, find information on school playground equipment.



Design Challenge: Design and build a structure for the playground. Write a short paragraph describing those geometric concepts that apply to your structure. Make a drawing of your structure labeling angles and giving their measurements. Be prepared to share your paragraph and structure drawing with the class.

Criteria:

Your structure must

- fit within your 10" by 10" coordinate square on the playground model
- be no more than 12" high
- be colorful and neat
- contain examples of geometric shapes (circle, square, triangle, and rectangle)
- contain examples of right, acute, and obtuse angles.

Materials: You may select from the items below.

- 2 strips of balsa wood per student
- wooden dowels
- 10" by 10" cardboard base
- craft sticks
- tag board
- general art supplies
- glue
- any recycled materials

Tools:

- ruler
- saw
- drill
- vice
- file
- jig
- safety glasses

Targeted Standards of Learning: Mathematics 5.8, 5.11, 5.13
Supporting Standards of Learning: Science 5.1
Mathematics 5.9, 5.15
English 5.1, 5.3, 5.7, 5.8
Computer/Technology 5.4

Targeted Standard for Technological Literacy: 12
Supporting Standards for Technological Literacy: 11, 20

Playground Construction



Targeted Standards of Learning: Mathematics 5.8, 5.11, and 5.13

- The student will describe and determine the perimeter of a polygon and area of a square, rectangle, and right triangle given the appropriate measures.
- The student will choose an appropriate measuring device and unit of measure to solve problems involving measurement of
 - length-part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
 - weight/mass-ounces, pounds, tons, grams, and kilograms;
 - liquid volume-cups, pints, quarts, gallons, milliliters, and liters;
 - area-square units; and
 - temperature-Celsius and Fahrenheit units.

Problems also will include estimating the conversion of Celsius and Fahrenheit units relative to familiar situations (water freezes at 0°C and 32°F , water boils at 100°C and 212°F , normal body temperature is about 37°C and 98.6°F).

- The student will measure and draw right, acute, and obtuse angles and triangles, using appropriate tools.

Targeted Standard for Technological Literacy: Standard 12

- Students will develop the abilities to use and maintain technological products and systems.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Understanding of targeted Mathematics Standards of Learning 5.8, 5.11, and 5.13 Basic understanding of the design process Introduction to the safe use of tools (if using wood strips and dowels) 	<ul style="list-style-type: none"> See Design Brief for recommended materials. Teachers may substitute materials. Elementary tools as found in tool list Recycled and found objects may be used in place of wood strips. 	<ul style="list-style-type: none"> Always wear safety glasses when sawing or drilling. Have an adult present when student is using saw. 	<ul style="list-style-type: none"> Individual or pairs 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessment KWL 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (30 min.) Sessions 2-4: Building (30 min. each) Session 5: Completing Portfolio (30 min.) Session 6: Sharing and evaluating (45 min.)

Name _____

Playground Construction



Group Members: _____

1. What is the problem? State the problem in *your own words*.

2. Research: Use the Internet, encyclopedias, or other reference books to research the structure you will design and build. Write down any information you find.

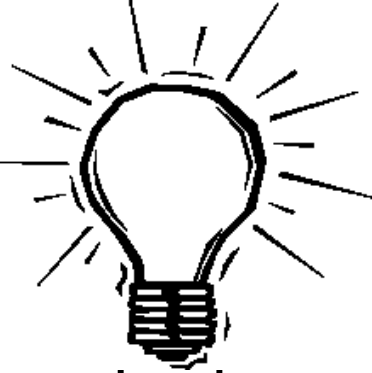
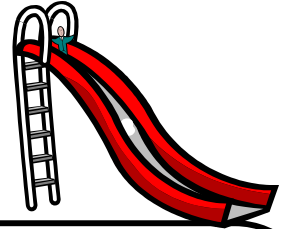
Targeted Standards of Learning: Mathematics 5.8, 5.11, 5.13
Supporting Standards of Learning: Science 5.1
Mathematics 5.9, 5.15
English 5.1, 5.3, 5.7, 5.8
Computer/Technology 5.4

Targeted Standard for Technological Literacy: 12
Supporting Standards for Technological Literacy: 11, 20

Name _____

3. Brainstorm solutions.

Draw or describe some possible solutions.



Name _____

4. Planning: Playground Construction

Choose your favorite playground structure and make a drawing that shows how the design will work.

Draw the working parts.

Label the materials you will use on each part of the structure.



A large, empty rectangular area with rounded corners, intended for drawing and labeling the playground structure.

Name _____

5. Create the solution you think is best.

Keep notes below about the problems you have and how you solve them.



Name _____

6. Test your solution.

- | | | |
|---|-----|----|
| • Does your structure fit on the 10" by 10" base? | YES | NO |
| • Is your structure no more than 12" high? | YES | NO |
| • Does your structure contain geometric shapes? | YES | NO |
| • Does your structure contain right, acute, or obtuse angles? | YES | NO |
| • Is your project neat and colorful? | YES | NO |



Name _____

7. Evaluate your solution.

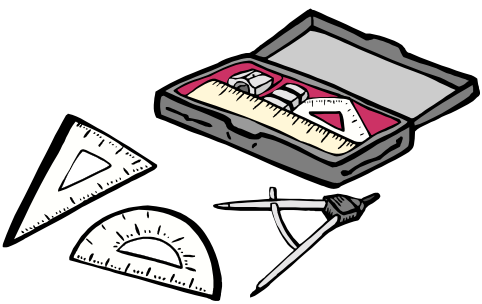
Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____



8. Use Geometry to Build a Playground.

Identify and describe the geometric concepts your playground structure demonstrates.

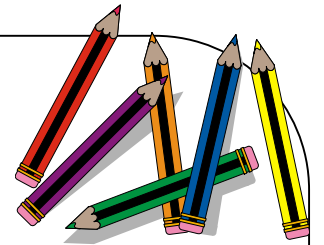
Guided Portfolio—8

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.

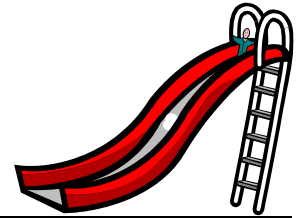


How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____

KWL: Playground Construction



What we <u>K</u> now.	What we <u>W</u> ant to know. Sample Questions	What we <u>L</u> earned.
	<p>What safety issues are related to playground construction?</p> <p>What materials should be used?</p> <p>What are popular playground structures?</p>	

Targeted Standards of Learning:
Supporting Standards of Learning:

Mathematics 5.8, 5.11, 5.13
Science 5.1
Mathematics 5.9, 5.15
English 5.1, 5.3, 5.7, 5.8
Computer/Technology 5.4

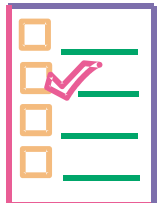
Targeted Standard for Technological Literacy: 12
Supporting Standards for Technological Literacy: 11, 20

Rubric for *Playground Construction*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the structure to make sure <ul style="list-style-type: none"> it fit the 10" by 10" base it was no more than 12" high it contained identified geometric shapes it had right, acute, or obtuse angles that were measured it was colorful and neat. 					
The student made a drawing that <ul style="list-style-type: none"> showed names and measurements of angles. 					
The student wrote a paragraph that <ul style="list-style-type: none"> described the structure described geometric concepts. 					
The student evaluated how he/she could make it better next time.					



Rubric for *Playground Construction*

Name _____

Date _____



Oral Communication Rubric	no evidence	limited understanding	some understanding with room for improvement	good understanding with room for improvement	substantial understanding
	0	1	2	3	4
5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities. a) Participate in and contribute to discussions across content areas. b) Organize information to present reports of group activities. c) Summarize information gathered in group activities.					
5.2 The student will use effective nonverbal communication skills. a) Maintain eye contact with listeners. b) Use gestures to support, accentuate, and dramatize verbal message. c) Use posture appropriate for communication setting.					
5.3 The student will make planned oral presentations. a) Determine appropriate content for audience. b) Organize content sequentially or around major ideas. c) Summarize main points before or after presentation. d) Incorporate visual aids to support the presentation. e) Use grammatically correct language and specific vocabulary.					

Standards of Learning

English (2002)

Oral Language

- 5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities.
 - a) Participate in and contribute to discussions across content areas.
 - b) Organize information to present reports of group activities.
 - c) Summarize information gathered in group activities.
- 5.3 The student will make planned oral presentations.
 - a) Determine appropriate content for audience.
 - b) Organize content sequentially or around major ideas.
 - c) Summarize main points before or after presentation.
 - d) Incorporate visual aids to support the presentation.
 - e) Use grammatically correct language and specific vocabulary.

Reading

- 5.7 The student will demonstrate comprehension of information from a variety of print resources.
 - a) Develop notes that include important concepts, summaries, and identification of information sources.
 - b) Organize information on charts, maps, and graphs.

Writing

- 5.8 The student will write for a variety of purposes: to describe, to inform, to entertain, and to explain.
 - a) Choose planning strategies for various writing purposes.
 - b) Organize information.
 - c) Demonstrate awareness of intended audience.
 - d) Use precise and descriptive vocabulary to create tone and voice.
 - e) Vary sentence structure.
 - f) Revise writing for clarity.
 - g) Use available technology to access information.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 5.1 The student will plan and conduct investigations in which
- rocks, minerals, and organisms are identified using a classification key;
 - estimations of length, mass, and volume are made.
 - appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;
 - accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);
 - data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams);
 - predictions are made using patterns, and simple graphical data are extrapolated;
 - manipulated and responding variables are identified; and
 - an understanding of the nature of science is developed and reinforced.

Mathematics (2001)

Measurement

- 5.8 The student will describe and determine the perimeter of a polygon and the area of a square, rectangle, and right triangle, given the appropriate measures.
- 5.9 The student will identify and describe the diameter, radius, chord, and circumference of a circle.
- 5.11 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurement of
- length-part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
 - weight/mass-ounces, pounds, tons, grams, and kilograms;
 - liquid volume-cups, pints, quarts, gallons, milliliters, and liters;
 - area-square units; and
 - temperature-Celsius and Fahrenheit units.
- Problems also will include estimating the conversion of Celsius and Fahrenheit units relative to familiar situations (water freezes at 0°C and 32°F , water boils at 100°C and 212°F , normal body temperature is about 37°C and 98.6°F).
- 5.13 The student will measure and draw right, acute, and obtuse angles and triangles, using appropriate tools.

Geometry

- 5.15 The student, using two-dimensional (plane) figures (square, rectangle, triangle, parallelogram, rhombus, kite, and trapezoid) will
- recognize, identify, describe, and analyze their properties in order to develop definitions of these figures;
 - identify and explore congruent, noncongruent, and similar figures;
 - Investigate and describe the results of combining and subdividing shapes;
 - identify and describe a line of symmetry; and
 - recognize the images of figures resulting from geometric transformations such as translation (slide), reflection (flip), or rotation (turn).

Computer Technology (2001)

C/T5.4 The student will communicate through application software.

- a) Create a 1-2 page document using word processing skills, writing process steps, and publishing programs.
- b) Use simple computer graphics and integrate graphics into word-processed documents.
- c) Create simple databases and spreadsheets to manage information and create reports.
- d) Use local and worldwide network communication systems.

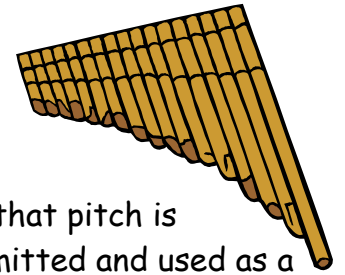
Standards for Technological Literacy

Standard 11: Students will develop the abilities to apply the design process.

Standard 12: Students will develop the abilities to use and maintain technological products and systems.

Standard 20: Students will develop an understanding of and be able to select and use construction technologies.

Music Makers



Background: We know that sound is a form of energy produced and transmitted by vibrating matter and that pitch is determined by the frequency of a vibrating object. You have been studying sound and how sound is transmitted and used as a means of communication.

Design Challenge: Design and build a musical instrument that will make at least three different pitches, and use it to create a tune of your own. You may use the materials that your teacher provides.

Criteria:

Your instrument must

- have at least three different recognizable pitches
- be accompanied by a paragraph explaining how your instrument works
- use only the materials provided by your teacher
- be attractive and neatly made
- be used to play a short tune.

Materials: You may select from the items below.

- | | | | | |
|--------------|----------------|--------------------|--------------|-----------------------|
| • straws | • rubber bands | • 6 inches of tape | • paper cups | • tissue paper |
| • card stock | • craft sticks | • paper clips | • balloons | • 24 inches of string |

Targeted Standard of Learning: Science 5.2
Supporting Standards of Learning: Science 5.1
Mathematics 5.11
English 5.1, 5.2, 5.3, 5.6, 5.7

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11, 17

Music Makers



Targeted Standard of Learning: Science 5.2

- The student will investigate and understand how sound is transmitted and is used as a means of communication.

Targeted Standard for Technological Literacy: Standard 9

- Students will develop an understanding of engineering design.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> Exposure to targeted Science Standard of Learning 5.2 Some understanding of the design process 	<ul style="list-style-type: none"> Check Design Brief for recommended materials. Teacher may substitute materials. Have various sizes of the following items <ul style="list-style-type: none"> rubber bands (widths and lengths) cups straws (lengths and diameters) empty boxes (rice, cereal, tissue, or shoe) 	<ul style="list-style-type: none"> Insure cleanliness of found objects 	<ul style="list-style-type: none"> Small groups or pairs Each student keeps own Guided Portfolio. Each group member must complete an instrument following the group's plans. Group members may work together to help write the required paragraph as long as each student turns in his or her own copy. 	<ul style="list-style-type: none"> Design Brief Guided Portfolio Rubric Assessments 	<ul style="list-style-type: none"> Session 1: Introducing Design Brief and Portfolio (60 min.) Session 2: Building (60 min.) Session 3: Sharing and evaluating (60 min.)

Guided Portfolio—1
Name _____

Music Makers



Group Members: _____

1. What is the problem? State the problem in *your own words*.

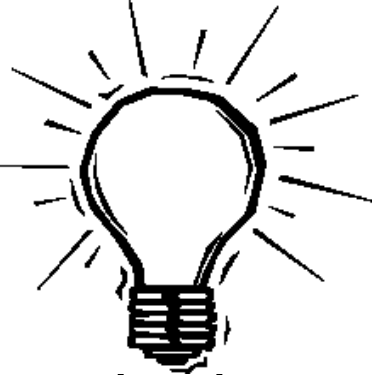
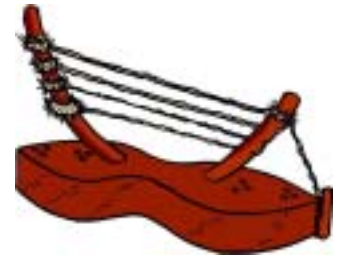
Targeted Standards of Learning: Science 5.2
Supporting Standards of Learning: Science 5.1
Mathematics 5.11
English 5.1, 5.2, 5.3, 5.6, 5.7

Targeted Standard for Technological Literacy: 9
Supporting Standards for Technological Literacy: 8, 10, 11, 17

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.





3. Create the solution you think is best.
Keep notes below about the problems you have and how you solve them.

Name _____

4. Test your solution.

- | | | |
|--|-----|----|
| • Does your instrument have at least three different recognizable pitches? | YES | NO |
| • Did you use only provided materials to make your instrument? | YES | NO |
| • Is your instrument attractive and neatly made? | YES | NO |
| • Did you write a paragraph explaining how your instrument works? | YES | NO |
| • Can you play a short tune on your instrument? | YES | NO |



Name _____



5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

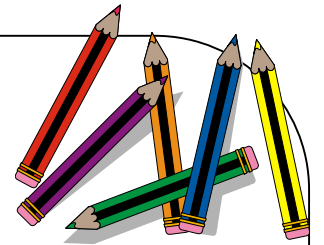
Guided Portfolio—6

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Music Makers*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the instrument to make sure <ul style="list-style-type: none"> it had at least three different recognizable pitches it was made of only the provided materials it was attractive and neatly made played a short tune it was accompanied by a paragraph explaining how it works. 					
The student evaluated how he/she could make it better next time.					



Rubric for *Music Makers*

Name _____

Date _____

Oral Communication Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities. a) Participate in and contribute to discussions across content areas. b) Organize information to present reports of group activities. c) Summarize information gathered in group activities.					
5.2 The student will use effective nonverbal communication skills. a) Maintain eye contact with listeners. b) Use gestures to support, accentuate, and dramatize verbal message. c) Use posture appropriate for communication setting.					
5.3 The student will make planned oral presentations. a) Determine appropriate content for audience. b) Organize content sequentially or around major ideas. c) Summarize main points before or after presentation. d) Incorporate visual aids to support the presentation. e) Use grammatically correct language and specific vocabulary.					



Standards of Learning

English (2002)

Oral Language

- 5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities.
 - a) Participate in and contribute to discussions across content areas.
 - b) Organize information to present reports of group activities.
 - c) Summarize information gathered in group activities.
- 5.2 The student will use effective nonverbal communication skills.
 - a) Maintain eye contact with listeners.
 - b) Use gestures to support, accentuate, and dramatize verbal message.
 - c) Use facial expressions to support and dramatize verbal message.
 - d) Use posture appropriate for communication setting.
- 5.3 The student will make planned oral presentations.
 - a) Determine appropriate content for audience.
 - b) Organize content sequentially or around major ideas.
 - c) Summarize main points before or after presentation.
 - d) Incorporate visual aids to support the presentation.
 - e) Use grammatically correct language and specific vocabulary

Reading

- 5.6 The student will read and demonstrate comprehension of nonfiction.
 - a) Use text organizers such as type, headings, and graphics to predict and categorize information.
 - b) Identify structural patterns found in nonfiction.
 - c) Locate information to support opinions, predictions, and conclusions.
 - d) Identify cause-and-effect relationships.
 - e) Identify compare and contrast relationships.
 - f) Skim materials to develop a general overview of content and to locate specific information.
 - g) Identify new information gained from reading.
- 5.7 The student will demonstrate comprehension of information from a variety of print resources.
 - a) Develop notes that include important concepts, summaries, and identification of information sources.
 - b) Organize information on charts, maps, and graphs.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 5.1 The student will plan and conduct investigations in which
- a) rocks, minerals, and organisms are identified using a classification key;
 - b) estimations of length, mass, and volume are made.
 - c) appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;
 - d) accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);
 - e) data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams);
 - f) predictions are made using patterns, and simple graphical data are extrapolated;
 - g) manipulated and responding variables are identified; and
 - h) an understanding of the nature of science is developed and reinforced.

Force, Motion, and Energy

- 5.2 The student will investigate and understand how sound is transmitted and is used as a means of communication. Key concepts include
- a) frequency, waves, wavelength, vibration;
 - b) the ability of different media (solids, liquids, gases) to transmit sound; and
 - c) uses and applications (voice, sonar, animal sounds, musical instruments).

Mathematics (2001)

Measurement

- 5.11 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurement of
- a) length-part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
 - b) weight/mass-ounces, pounds, tons, grams, and kilograms;
 - c) liquid volume-cups, pints, quarts, gallons, milliliters, and liters;
 - d) area-square units; and
 - e) temperature-Celsius and Fahrenheit units.

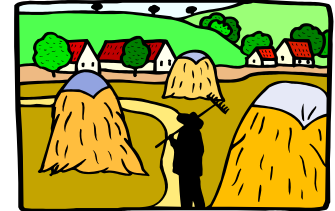
Problems also will include estimating the conversion of Celsius and Fahrenheit units relative to familiar situations (water freezes at 0°C and 32°F , water boils at 100°C and 212°F , normal body temperature is about 37°C and 98.6°F).

Standards for Technological Literacy

- Standard 8: Students will develop an understanding of the attributes of design.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- Standard 11: Students will develop the abilities to apply the design process.
- Standard 17: Students will develop an understanding of and be able to select and use information and communication technologies.

Model of a Colony

Background: The class has been learning about the American Colonies during the 1700s. We have studied the New England, Mid-Atlantic, and Southern colonies. The class will be divided into 3 groups, with each group designing and building a model of one of the colonies.



Design Challenge: Each group will research a particular colony and then work together to construct an accurate model. It is important to plan together and decide who will be responsible for building each aspect of the colony. The group will decide on a uniform scale for each model.

Criteria:

Your colony model must

- be built to scale
- accurately represent the assigned colony
- show various buildings, fences, and other structures
- have at least one moveable part that represents a simple machine used in the 1700s and that can move at least five times
- be neat and attractive.

Materials: You may select from the items below.

- cardboard base
- wood strips
- recycled and/or found materials
- art straws
- scissors
- general art supplies
- glue
- craft sticks

Targeted Standard of Learning: History and Social Science USI.5b
Supporting Standards of Learning: English 5.1, 5.7, 5.8
Science 5.1
Mathematics 5.11

Targeted Standards for Technological Literacy: 6, 20
Supporting Standards for Technological Literacy: 1, 9

Model of a Colony

Targeted Standard of Learning: USI 5b

- The student will demonstrate knowledge of the factors that shaped colonial America by comparing and contrasting life in the New England, Mid-Atlantic and Southern colonies, with emphasis on how people interacted with their environment.



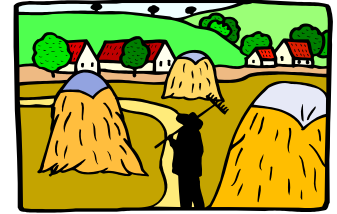
Targeted Standards for Technological Literacy: Standard 6, Standard 20

- Students will develop an understanding of the role of society in the development and use of technology.
- Students will develop an understanding of and be able to select and use construction technologies.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Knowledge of targeted History and Social Science Standard of Learning USI.5b • Some understanding of the design process 	<ul style="list-style-type: none"> • See Design Brief for recommended materials. Teachers may substitute materials. • Reference materials on American colonies 	<ul style="list-style-type: none"> • Insure cleanliness of found and recycled materials. 	<ul style="list-style-type: none"> • Three groups for the three colonies 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio • Rubric Assessment 	<ul style="list-style-type: none"> • Session 1: Introducing Design Brief and Portfolio (30 min.) • Sessions 2 and 3: Building and Portfolio work (30 min. each) • Session 4: Testing, sharing, and evaluating (45 min.)

Name _____

Model of a Colony



Group Members: _____

1. What is the problem? State the problem in *your own words*.

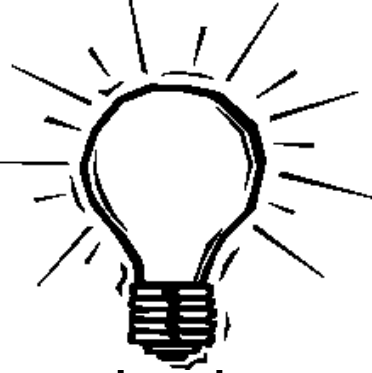
Targeted Standard of Learning: History and Social Science USI 5b
Supporting Standards of Learning: English 5.1, 5.7, 5.8
Science 5.1
Mathematics 5.11

Targeted Standards for Technological Literacy: 6, 20
Supporting Standards for Technological Literacy: 1, 9

Name _____

2. Brainstorm solutions.

Draw or describe some possible solutions.



Name _____

3. Create the solution you think is best.

Keep notes below about the problems you have and how you solve them.



Name _____

4. Test your solution.

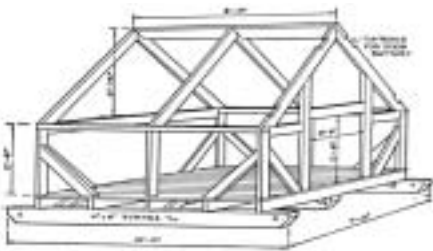
- | | | |
|---|-----|----|
| • Is your colony model built to scale? | YES | NO |
| • Does it accurately represent the assigned colony? | YES | NO |
| • Does it show various buildings, fences, and other structures? | YES | NO |
| • Does it have at least one moveable part? | YES | NO |
| • Can the part move at least five times? | YES | NO |
| • Is your colony neat and attractive? | YES | NO |



Name _____

5. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?



What would you have done differently?

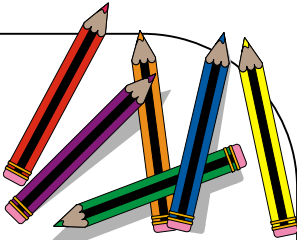
Could you add to it to make it better? What would you add to it?

Name _____

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Rubric for *Model of a Colony*

Name _____

Date _____

Design Brief Rubric	no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the model to make sure <ul style="list-style-type: none"> it was built to scale it accurately represented the colony it contained buildings, fences, and other structures it had one moveable part the moveable part could be moved at least five times it was attractive and neat. 					
The student evaluated how he/she could make it better next time.					



Rubric for *Model of a Colony*

Name _____

Date _____



Oral Communication Rubric		no evidence 0	limited understanding 1	some understanding with room for improvement 2	good understanding with room for improvement 3	substantial understanding 4
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Standards of Learning

English (2002)

Oral Language

- 5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities.
- a) Participate in and contribute to discussions across content areas.
 - b) Organize information to present reports of group activities.
 - c) Summarize information gathered in group activities.

Reading

- 5.7 The student will demonstrate comprehension of information from a variety of print resources.
- a) Develop notes that include important concepts, summaries, and identification of information sources.
 - b) Organize information on charts, maps, and graphs.

Writing

- 5.8 The student will write for a variety of purposes to describe, to inform, to entertain, and to explain.
- a) Choose planning strategies for various writing purposes.
 - b) Organize information.
 - c) Demonstrate awareness of intended audience.
 - d) Use precise and descriptive vocabulary to create tone and voice.
 - e) Vary sentence structure.
 - f) Revise writing for clarity.
 - g) Use available technology to access information.

History and Social Science (2001)

United States History to 1877

Exploration to Revolution: Pre-Columbian Times to the 1770s

- USI.5 The student will demonstrate knowledge of the factors that shaped colonial America by
- a) describing the religious and economic events and conditions that led to the colonization of America;
 - b) comparing and contrasting life in the New England, Mid-Atlantic, and Southern colonies, with emphasis on how people interacted with their environment;
 - c) describing colonial life in America from the perspectives of large landowners, farmers, artisans, women, indentured servants, and slaves;
 - d) identifying the political and economic relationships between the colonies and England.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 5.1 The student will plan and conduct investigations in which
- a) rocks, minerals, and organisms are identified using a classification key;
 - b) estimations of length, mass, and volume are made.
 - c) appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;
 - d) accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);
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Mathematics (2001)

Measurement

- 5.11 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurement of
- a) length-part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
 - b) weight/mass-ounces, pounds, tons, grams, and kilograms;
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 - d) area-square units; and
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- Problems also will include estimating the conversion of Celsius and Fahrenheit units relative to familiar situations (water freezes at 0°C and 32°F , water boils at 100°C and 212°F , normal body temperature is about 37°C and 98.6°F).

Standards for Technological Literacy

- Standard 1: Students will develop an understanding of the characteristics and scope of technology.
- Standard 6: Students will develop an understanding of the role of society in the development and use of technology.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 20: Students will develop an understanding of and be able to select and use construction technologies.

Acknowledgments

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Dr. Patricia Hutchinson	The College of New Jersey
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Dr. Ron Todd	The College of New Jersey



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